

Mr. W.

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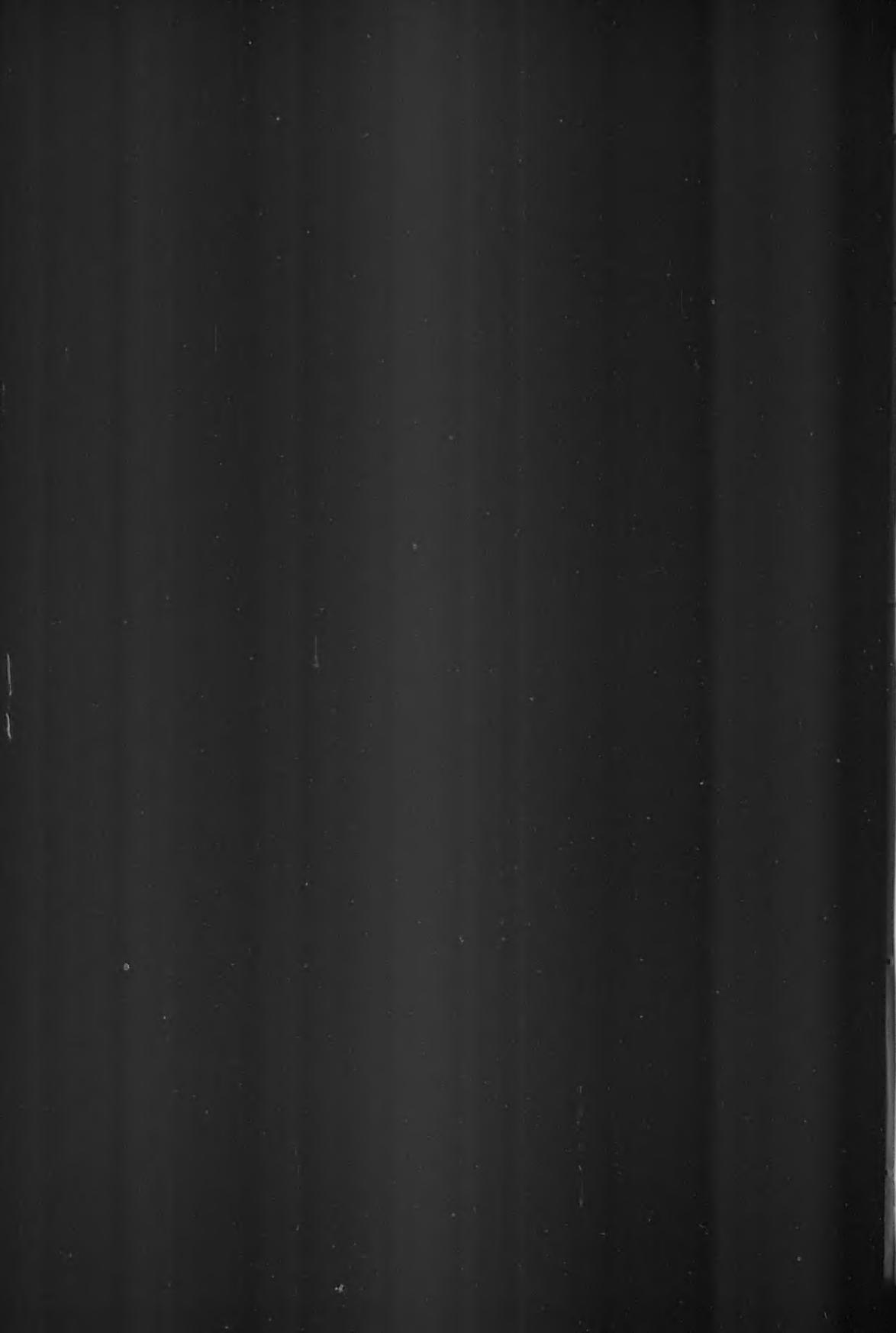
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Issued February 5, 1921

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Edited by
Joseph Grinnell

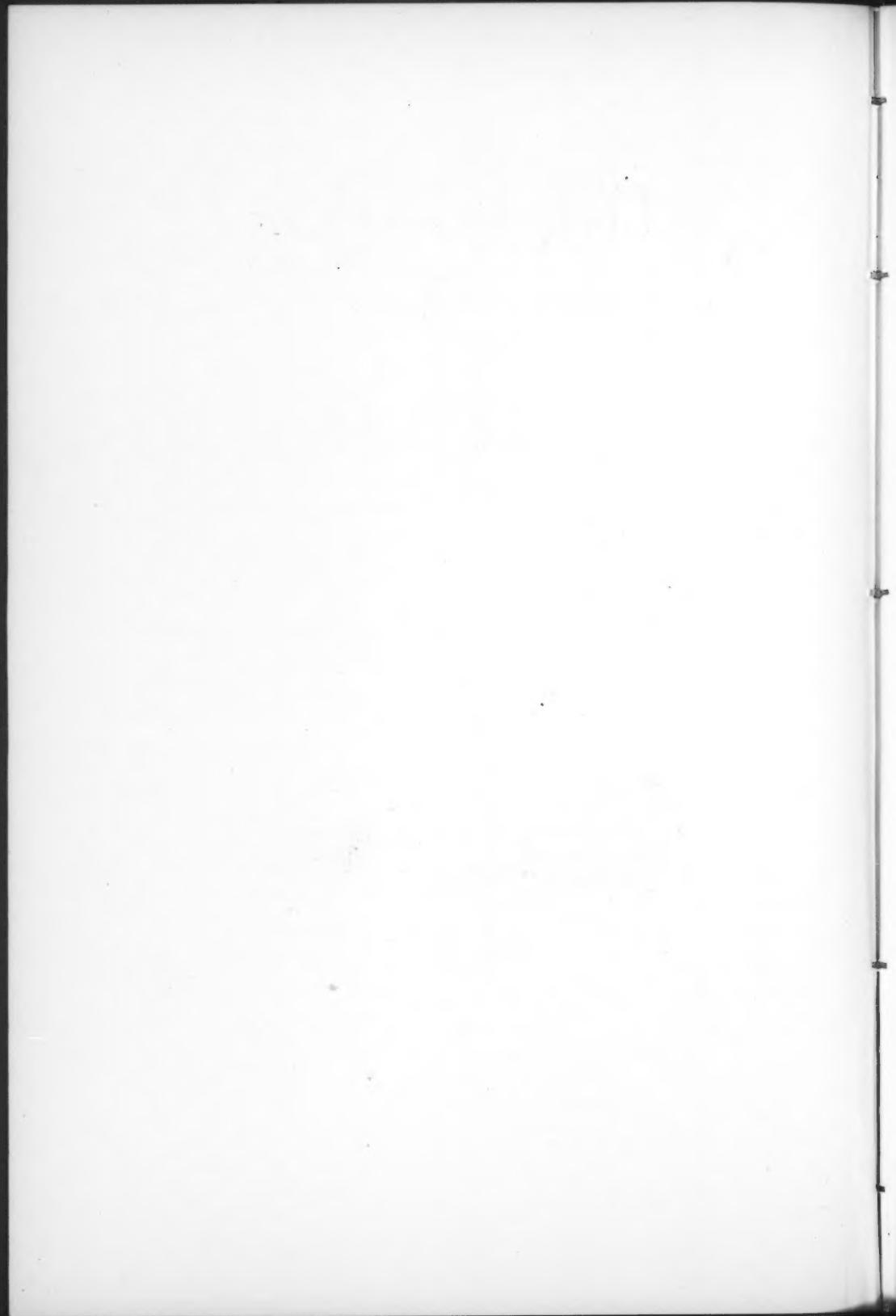
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ACORN-STORING BY THE CALIFORNIA WOODPECKER

By WILLIAM E. RITTER

WITH FOUR PHOTOS

NOT MANY phenomena of bird life in California are more widely known and have been more frequently commented upon than the one which is the subject of this article. When, however, one inquires about the extent of accurate knowledge on the subject, he may well be surprised that it is so slight. Even the published references to it, though numerous, are mostly brief and general. And no ornithologist, so I am told by Professor Joseph Grinnell, the authority on the literature of California birds, has pretended to investigate the subject in any detailed way. The following pages contain the results of observations and reflections which, though extending over several years, were chiefly made during the last year and a half.

So well known are the facts in their general features that a very cursory statement of them is enough. The California Woodpecker (*Melanerpes formicivorus bairdi*) is resident in most of the wooded portions of California. It has the habit, especially in regions where oaks abound, of pecking holes on the surface of the trunks and larger limbs of trees, these holes approximating an acorn in size, and inserting acorns into these, usually one in each hole. I have, however, seen many holes containing two nuts, not very close-fitting at that.

Where oaks and pines are commingled, as they frequently are in California, the pines are usually taken as storage trees. So far as I have observed, only the older trees are utilized, this seemingly being due to the fact that only in such trees has the outermost bark layer become marked off into areas or blocks presenting considerable unbroken surfaces suitable for the holes. Query is frequently made as to whether this hole pecking is injurious to the trees. Although I have examined many storage pines in widely separated localities, I have never seen anything even suggestive of harm to the trees from the holes. Never, so far as I have noticed, do the holes pierce through into the deeper living layers of the bark.

Though pine trees are, according to my observations, by far the most generally utilized for storing, oaks are used to some extent, even in places where pines as well as oaks are available. But in no instance have I seen a living oak so used. Not only dead oaks but those from which the bark has been shed are usually requisitioned, so it seems. The possible bearing of this will be noticed later.

Although unusual animal performance like this is sufficient in itself to excite interest and elicit careful inquiry, the thoughtful naturalist is likely to be more attracted to particular phenomena by their probable bearing on some general problem in which he is interested, than by their uniqueness. The broader problem which, in this instance, has been the leading motive of my observations, is that of the efficiency of instinctive activity. How thoroughly do such practices meet the needs of the animals which perform them? In other words, how near to perfection is their adaptiveness?

Two early cursory observations raised the conjecture that the habit of the California Woodpecker might, if followed up, yield enlightening facts on this question. One of these was the very large number of holes I had seen in some trees. Thus, fifty feet of a prostrate pine tree which I saw in the San Jacinto Mountains several years ago, contained, according to an estimate made with considerable care, 31,800 holes. The query easily arises, Is every hole in such a case actually used as the receptacle of a nut? The account which follows will bring out rather convincing testimony on this question.

The other and much more striking fact bearing on the general problem of adaptiveness, was brought to my notice by Dr. Grinnell. It is that occasionally the woodpeckers gather pebbles instead of acorns and place them in the holes. The first instance of this which came to my attention consisted of a considerable section of a barkless oak log now in the Museum of Vertebrate Zoology at Berkeley (Fig. 2), in which there is a large number of holes nearly all of which contain pebbles. This specimen, which came from Sonoma County, California (where there are no pine trees) is conclusive proof to Dr. Grinnell that the pebble-storing as well as the acorn-storing is the work of woodpeckers. Grinnell tells me that he looked into the matter at the time the specimen was received and found that the location of the tree and other conditions were such as to preclude any likelihood that the work was done by humans. Nor is there any other animal resident in that locality to which the performance could be attributed with any degree of probability.

Nor does this ease of pebble-storing stand alone. Mr. C. R. Orcutt, a naturalist of wide experience in the southwest, has recorded a similar instance observed by him in Lower California ("Stones placed in pine-trees by birds", *Science*, March 14, 1884, p. 305). The trees (Jeffrey pines) were in this instance situated at an elevation of 6,000 feet and in an almost uninhabited region, so there was practically no chance for the stones to have been put where they were by human hands.

OBSERVATIONS

During a holiday outing at Cuyamaca reservoir, San Diego County, California, July 3-5, 1919, I found numerous pines (Jeffreys) used by the woodpeckers as storage trees. Some of these contained a large number of holes, the great majority of which were filled with acorns of the black oak (*Q. kelloggii*), the prevailing oaken neighbors of these pines. But while some of the trees were thus well stored, others had only a fraction of the holes acorn-filled; and two trees in particular, as thickly punctured as any I have ever seen, contained not a single acorn or any litter roundabout indicating that the birds had given the trees the least attention for many a month.

One of these abandoned granaries struck me as specially interesting from the fact that many of the holes, though not new, were to all appearances in perfect condition for the reception of nuts; and the further fact was clear

that both oaks and acorns were abundantly present all about the pine. Why was so much good store room unused? This query was made pertinent by the fact that many new holes had recently been made in near-by trees. Undoubtedly the suitableness of the holes for storing suffers impairment with age. As the trees grow older, the outermost layers of bark gradually crumble away and reduce the depths of the holes so they would need re-drilling to keep them at full depth. Whether such renovation ever really takes place or not, I am not certain, but probably it does in some instances. Then, too, occasionally holes become more or less filled with pitch. But neither of these sources of

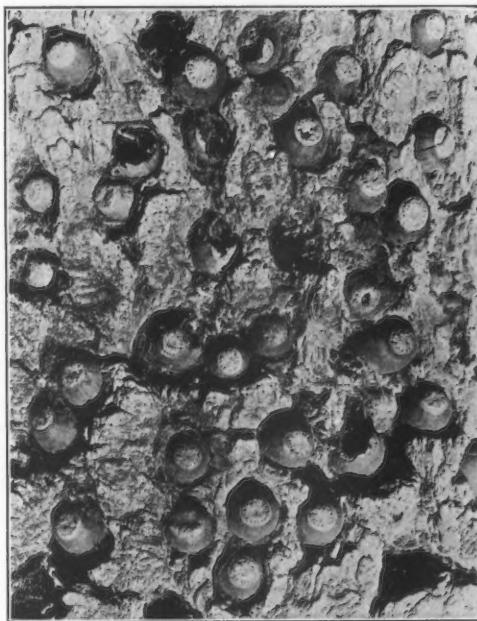


Fig. 1. NORMAL ACORN-STORAGE BY CALIFORNIA WOODPECKER, IN DEAD BRANCH OF BLUE OAK; PORTION PRESERVED IN MUSEUM OF VERTEBRATE ZOOLOGY TAKEN BY I. L. KOPPEL NEAR GILROY, CALIFORNIA, IN OCTOBER, 1919.

impairment applied to very many of the holes in the particular tree to which reference is now made.

By measurements and countings on one of the most abundantly stored trees of this lot, I estimated that there was an average of 60 acorns per square foot of bark and that in an area of the trunk surface, having an average girth of eleven feet, and a height of twenty feet, there were stored 13,200 acorns. Although many nuts could be seen above the elevation indicated, the size of the trunk and the irregularity of distribution of nuts made it impractical to estimate numbers. Since I shall have occasion to refer to this particular tree

in speaking of later visits, I will call it storage-tree A. Examination of the acorns in this and other trees of the locality yielded the following results that seemed significant.

Almost certainly a very great proportion of all the nuts were of the crop of the preceding year, 1918, and were garnered in the fall of that year. This conclusion I am able to draw now from observations made then and since. The evidence is in the state of weathering of the exposed butt ends of the acorns. Almost without exception the nuts are inserted tip in and base out, most of them fitting the hole snugly. Although I have never been so fortunate as to see the work done, residents of this locality with whom I have talked say that the birds "hammer the acorns in good and hard." The tight fit of many, though not all, of the nuts is in keeping with this statement.

The other fact which enables me to know now the age and storage time of the acorns examined in July, 1919, comes from my observations this, 1920, autumn. On visiting the trees October 18 and 19 this year, I found that practically the entire acorn crop of the season had either dropped to the ground, where the nuts were abundant under many trees, or had been gathered by the birds, squirrels, etc. Very few indeed were found on the trees. By comparing the condition of these new acorns with that of those taken from the storage trees in July, 1919, and that of those which had lain on the ground over a winter, it became clear that, as already said, the nuts examined in July were stored during the early fall of the year before, that is, of 1918:

The other significant fact brought out by the July examination was the prevailing freedom of the nuts from "worminess" and their generally excellent state of preservation. Few indeed of the many nuts opened contained either eggs or grubs of the nut weevil which typically infests the acorns of this region. The significant thing about this fact is that, taken along with the known developmental career of these weevils, we are able to see clearly that if the birds were going to utilize this year's stores for food, not grubs but the meats of perfectly good acorns would almost certainly have to be eaten. This would not be in accordance with a widely held theory as to what the acorns are stored for. According to this theory it is grubs and not acorn meats that the birds want. The conclusion my observations lead to, on this point, will be given presently.

February 8, 1920, was the date of my next visit to the trees, this time in company with Professor C. Judson Herrick of the University of Chicago. That the acorn stores were being drawn upon by the birds for food, was the most striking fact which met our view, as we came to the storage trees one after another. Although we were not fortunate enough to catch any of the birds in the act, what they had been doing was clear enough, speaking generally, by the marks they left, especially around some of the trees. These marks consisted of quantities of litter on the ground around the bases of the trees, this consisting of acorn shells and bits of bark from the trees. Examination of the shells told much of the story of woodpecker dining methods when acorns are the chief food. That it is at least very common for the nuts to be taken whole from the storage places and opened either on the ground near the tree or in the branches of the same tree, is manifest from the numerous instances in which the nuts were opened on the side, the opening frequently being relatively small and quite regular of outline. Such openings could not, of course, be made while the nuts are close-fitted into the storage holes. But even when

the shell leavings were proof that the opening process consisted more in tearing than puncturing, the pieces were of such form as strongly to suggest that the nuts were operated on after having been taken from the holes. Not many empty shells were found in situ, or even in the litter, opened at the butt, as would generally have to be the case had they been opened before extraction from the store-holes. These and later observations effectually disprove the theory that the holes are used by the birds as a sort of vise for holding the nuts in order that they may be opened.

Another fact brought to light by examining the shell litter was that most

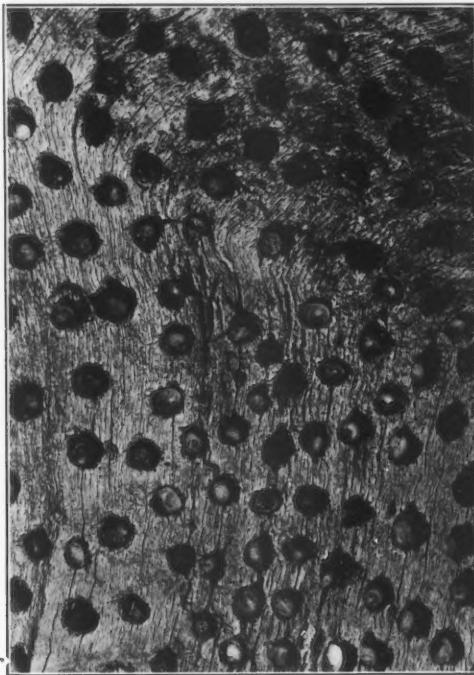


Fig. 2. PEBBLES INSERTED IN ACORN-PITS; SUPPOSED TO HAVE BEEN DONE BY CALIFORNIA WOODPECKER; PART OF SPECIMEN IN MUSEUM OF VERTEBRATE ZOOLOGY PROCURED ON SONOMA MOUNTAIN NEAR SANTA ROSA, CALIFORNIA, IN MAY, 1913, BY GEO. P. MCNEAR.

of the nuts which had been opened so far this winter were grub-containers. This was easily recognizable by the excrement, etc., of the grubs still clinging to the inner surfaces of the shells. The clean inside of the shell of a grubless nut as compared with the dirtiness of a grubby shell makes it possible to recognize at a glance even as to rather small pieces of shell, whether the nut was "wormy". Furthermore, examination of many acorns still in the store-holes, found many more "sound" than "wormy" ones. The impression gained from the examination at this time was strongly to the effect that while the birds

were opening some grubless acorns, they were really after the grubby ones. For instance a few cases were noticed where sound nuts had been opened, but where the meat was still in place—as though the bird had opened the nut in the expectation of getting a grub, had recognized its mistake, and had then discarded the nut. But systematic, quantitative study of nut remains through a winter would be necessary to prove such a selective process of food consumption as is here indicated.

On this visit some attention was given to the hole-drilling itself. One tree in particular contained a considerable number of perfectly fresh acornless holes, some of which were completed while others were in various stages of advancement. That these had really been only recently made seemed highly probable. But if so, wherefore had this been done, the storing period for the season having ended some four months ago? I have seen no indication that acorns are garnered at any other time than in early fall when the crop is freshly ripe.

Another observation at this time was suggestive of an answer to the question just asked, this observation tending to confirm the occasionally expressed surmise that the hole-drilling is not primarily for acorn storing but is an incident to the bird's pursuit of insects in the bark itself. An instance was found of a dead pine, the bark of which showed many small holes made by an insect, probably. Some woodpeckers, presumably the California, had been prodding the bark of this tree almost certainly after the insects responsible for these minute holes. Although in some cases the woodpecker work was rather diffuse, and quite unlike the clear-cut acorn storage holes, in other cases the perforations were quite similar to those made for acorns.

Assuming, now, that this bark puncturing was done by the California Woodpecker (which, however, is not quite certain), an instance is furnished which might be interpreted as reminiscent, so to speak, of the bird's original purpose of hole drilling. Though very fragmentary, this observation was sufficiently suggestive to warrant considerable effort at extension. But the circumstances under which this mid-winter visit was made were such as to preclude the possibility of following the point farther then. On later visits a few additional facts were observed bearing on the general question of hole drilling. These will be presented in due course.

My next visit was on June 7-9, 1920. Several of the trees from which the acorns had been partly used in February, were now almost entirely acornless, not even empty shells being left in the holes, excepting here and there. Examination of shell fragments in the litter furnished evidence that the meats of sound nuts had now been used as well as grubs from "wormy" ones, this evidence consisting in applying the criteria already mentioned as to shell remains of sound and wormy nuts. Many shell pieces, some of them half shells or even more, were seen containing no remnants of meats, but likewise no tracts of worm leavings. The meats had surely been removed, in all likelihood, by the woodpeckers, and for food. But certainty, on the last two points, was impossible since my efforts to catch the birds in the act were as little successful on this as on previous visits. It is, of course, possible that sound nuts opened by woodpeckers and cast aside when found to contain no grubs, may have been deprived of their meats by other animals, as mice or rats. However, ample indirect evidence of the sort here indicated, coupled with the direct evidence afforded by examination of stomach contents (Grinnell and Storer, Yosemite

Report, MS) makes it all but certain that the woodpeckers make extensive use of the meats of sound acorns as well as of grubs of wormy ones.

But, while some of the storage trees were completely emptied of nuts, tree A (so designated in the account of my July, 1919, visit), and the others of its group, had hardly been drawn upon at all. The acorns were in place much as they had been since stored away in the fall of 1918, and there was almost none of the litter on the ground around the trees which was so abundant around the emptied trees a half mile away.

Now, indications of weathering of the exposed ends of the stored acorns

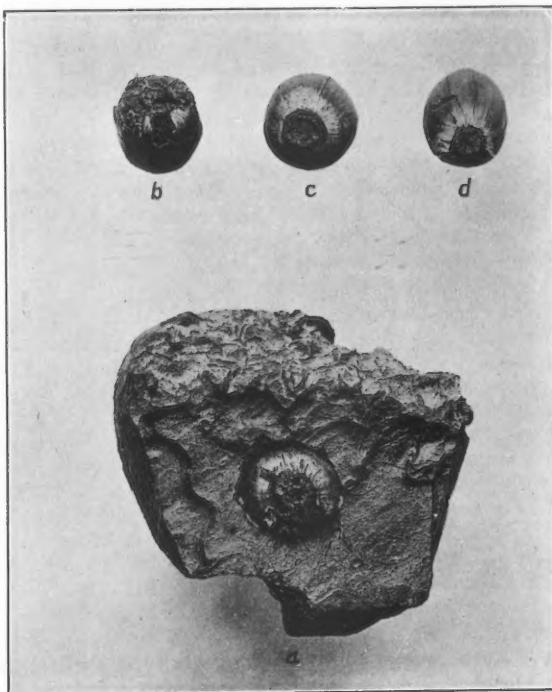


Fig. 3. *a*, BLOCK OF BARK, JEFFREY PINE, WITH ACORN IN PLACE, SHOWING CLOSE FIT, BUTT OUT, AND OLD AGE OF ACORN AS INDICATED BY WEATHERING; *b*, *c*, AND *d*, ACORNS TAKEN FROM HOLES, THREE STAGES OF DETERIORATION (*d*, *c*, *b*) FROM AGE AND EXPOSURE.

(previously noticed, but only cursorily) attracted my special attention. Such indications consist in a bleaching of the shell and a fine cracking of its surface. Following this intimation as to the keeping qualities of the acorns, I opened many sound nuts to see if the meats were showing signs of age. Without exception the meats thus examined were much darker in color than are those of fresh nuts. In many cases the color was a decided brown and in some this had advanced well toward black. The impression one got was that unless

these acorns were utilized before long they would be "spoiled". What had happened in this regard at the end of another four months will be seen presently.

At this time attention was given to the suggestion gained on previous visits as to the hole-boring business itself—as to its origin and extent. The suggestion made by a single observation on the February visit was, it will be recalled, that pursuit of insects in the bark itself might be the inception of the habit. But such following up as could be made, of the clues then obtained, yielded no additional affirmative evidence on the point. Indeed it tended to disprove, if anything, the insect hunting hypothesis. For example, a few other dead pines were examined, the bark of which was thickly punctured with the small insect holes, but these had elicited no hole-picking by woodpeckers. In fact, so abundant was the evidence of insect life in and under the loose bark of one of these trees, that it struck me as rather surprising that woodpeckers had not made use of it in any way so far as could be judged.

But even if true that pursuit of bark-inhabiting insects were the original impulse to hole-drilling by the woodpeckers, almost certain is it that now the habit has little or no reference to its original purpose. I examined several holes during this visit, which had been very recently made in the healthiest, most perfect of bark of Jeffrey and Coulter pines. If the birds were after insects in these instances they certainly could not have been worse fooled as to where prey might be found.

And this observation raised again the question of the effectiveness of the habit. Recalling that the time was now June, a period when no acorns are available for storing, we should be obliged to suppose that these recently drilled holes were made in anticipation of the next crop of nuts still some three months from ripe. Perhaps it is permissible to reason that since there is a measure of foresight in storing the acorns, there may also be something of the same sort in making the holes. Why not the holes as well prepared some months before they can be filled, as the acorns stored some months before they are eaten? The question is a fair and interesting one and involves the further question of the specificness of the entire group of instincts involved. Does each bird make its own holes, and collect and store its own acorns for its own use? Or is the entire performance a generalized one, one, that is, in which hole-drilling, nut-storing, and nut-eating are all rather indiscriminate for the birds of a given locality?

So far as I know, absolutely no direct evidence is available on which to base answers to these questions. But from our general knowledge of bird instinct, it is highly probable that the operations are of the generalized type. Several of my observations are confirmatory of this view. Those on off season drilling are most readily interpreted from this standpoint. I revert to the point shortly.

Another observation made during this visit bears on the question of whether all holes made are actually used for storage. One tree in particular presented conditions in the height distribution of the stored acorns which seemed to have such a bearing. This was the circumstance that a distinctly larger proportion of the holes toward the base of the trunk contained acorns than did those up toward the middle of the trunk. By examining the higher parts of the trunk with glasses one could easily see that acorn-containing holes thinned out on going upward considerably more rapidly than did the holes

themselves. The impression from this was that while hole-drilling had been as conveniently and largely done high up as low down on the trunk, nut storage, since probably done for the most part, as previously seen, from nuts gathered on the ground, had been more convenient and so more practised on the lower portion of the trunk.

On this visit the stub of a long-dead, bark-denuded oak, probably a black oak, was examined, which was used by the woodpeckers as a granary, though

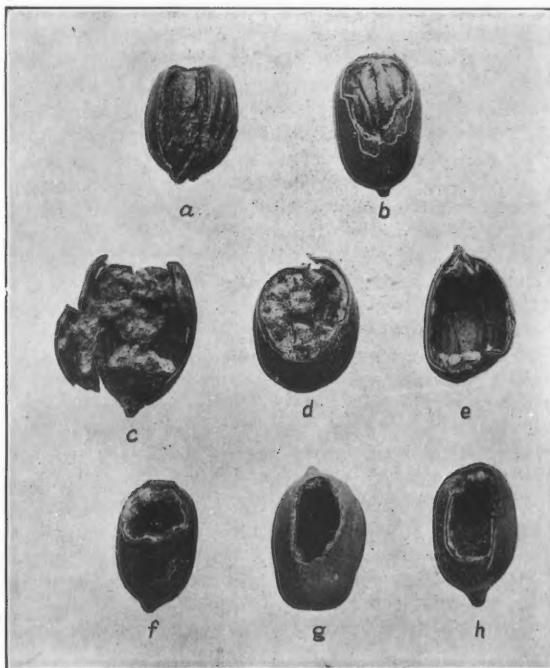


Fig. 4. *a*, A SOUND MEAT BUT NEARLY BLACK FROM AGE (HAD BEEN IN HOLE ABOUT 20 MONTHS); *b*, A SOUND MEAT HARDLY DARKENED AT ALL (HAD BEEN IN HOLE OVER ONE WINTER); *c* AND *d*, SHELLS CONTAINING WORM LEAVINGS, BUT WORMS GONE; *e*, SHELL, FROM WHICH A SOUND MEAT HAD BEEN TAKEN—NO WORM LEAVINGS; *f*, *g*, *h*, SHELLS OPENED ON THE SIDE; THE OPENING OF *g*, ESPECIALLY, IS SO FAR TOWARD THE TIP THAT IT COULD NOT HAVE BEEN MADE WHILE THE ACORN WAS IN PLACE IN THE BARK.

a majority of the holes contained no acorns and there was no evidence around the tree of recent acorn consumption. One of the most striking things here was the relation of the holes to cracks in the wood. In many instances a row of holes, some mere beginnings, followed, and were made as local enlargements of, a crack. Some of these holes contained acorns and some did not. Again, acorns had in some instances been placed in larger cracks where no drilling

had been done. Such a case readily suggests that the hole-drilling habit may have been connected originally with the habit of probing cracks and other natural cavities in dead trees while searching for insects. But since there were probably more holes in this tree not connected with cracks than were so connected, but were in the solid wood, we may suppose the crack-probing instinct being a generalized one, easily over-flowed as one might say, first to produce the hole-drilling habit in solid wood of the same dead tree, and afterward to the bark of live trees containing no cracks.

And by a parallel development the present acorn storing habit may have been perfected. At the beginning this may have operated only in using cracks and decay cavities, in dead trees for storing, but later extended to the drilled holes of the same trees, and later still to those drilled in the bark of living trees.

Conclusive evidence that nut-eating rodents (squirrels, rats) prey upon the acorns stored by the woodpeckers was first obtained on the present visit. Two trees were found on which the bark immediately around acorn holes had been gnawed by rodents, as unmistakably proved by the tooth marks. The acorns were gone from some of these holes, but not from all, thus showing that the marauders had failed in some of their efforts.

Squirrels (the Anthony Gray Squirrel) and rats (Southern Brush Rat) are both common hereabouts, and one or the other of these was in all probability the culprit. This observation clearly indicates an advantage in countersinking the nuts, as one may say, in the holes, and also in "hammering them in tight". With a little care and extra work the nuts could be so stored as to protect them pretty effectually against rodent pillage. And to a great extent, though by no means wholly so, as we shall see later, the storing realizes this protection quite well.

The next trip to the locality was planned with reference to the harvest time for the acorn crop of 1920. October 18-19 was the date on which it was made. The crop seemed to have been only moderately good this year. This was indicated by the fact that almost no nuts still remained on the trees, that very few were on the ground under some trees, though under many others a fairly generous number were present, and finally that while a goodly number of the storage trees had been moderately stored with fresh nuts, several of those most richly stored last year had received none or only a few this year—though, of course, the season was not far enough gone to make it impossible that more garnering would yet be done.

Attention was again given to the two trees having many holes but no nuts, mentioned in connection with previous visits. As before, neither of these contained a single nut or any other signs of having been recently worked at by the birds. Since this makes the third consecutive season in which these trees have been observed to be unused, it looks as though they are wholly abandoned. The general appearance of desertedness of one of them especially favors this conjecture.

The group of trees of which storage-tree A is one, presented the most interesting facts this time. These were now quite as heavily stored as when first seen, July, 1919, but not more than one-half of the nuts were of the 1920 crop, and very many of them were clearly the same as those seen on the first and all the intervening visits. The state of weathering of nuts, previously mentioned, was the decisive pointer to this conclusion. The darkened condition of the sound meats of the old nuts, referred to in connection with the visit of June,

1920, had now gone so far that many of the meats were thoroughly black. And besides, they now showed other clear evidences of deterioration. For one thing, they were more brittle than before. That they were well on the road to disintegration was clear. If not already beyond serviceability as woodpecker food, they surely soon would be if left unused. But with the new crop at hand and upon which the birds were already feeding, why should these old decaying nuts be eaten? Here was a store of several thousand acorns (6,000, say, in tree A alone—see estimate on previous page) destined to great if not complete loss. For even if consumed at once the old nuts could be of small food value as compared with the new ones.

A fortunate circumstance made possible an observation at this time which is probably significant as bearing on the spoiling of the acorns. A hard rain, which had been in progress all the night before, was falling while I was examining these particular trees. As a result of the downpour the acorns were thoroughly wet, the old ones especially being in a genuinely "water-logged" condition. Such soakings of the acorns as this must hasten their deterioration, especially since they are badly circumstanced for drying out.

I was considerably surprised this time by noticing that many of the newly stored acorns were protruding from the holes—not infrequently as much as a quarter or even a half inch. Although my attention had not before been drawn to the point, I am quite certain that I have never before seen acorns so much exposed. Indeed, as a rule, they are, as previously mentioned, more likely to be sunk below the surface of the bark than to project above it.

The point is significant as bearing on the exposure of the nuts to the depredations of squirrels and rats. Hundreds of the nuts of this year's harvest projected enough from the holes to make them easy plunder for the rodents; whereas as previously pointed out, when the nuts are counter-sunk, it is no simple thing for the marauders to get at them. Query: Is it possible that the absence of nuts projecting from the holes, as the rule is, is due to the fact that those left projecting when the new crop is garnered are soon taken by the robbers? Only much more observation than we now have on the actual performances of both woodpeckers and rodents, can answer this question. In the meantime what we can say with certainty is that many acorns are so stored as to be easily accessible to rodents*.

SUMMARY

Our observations and reflections on acorn storing by the California Woodpeckers in the Cuyamaca region, having now been presented as a running narrative, the main results may profitably be summed up in a few brief statements.

1. The storing habit of this woodpecker is an important element in the bird's solution of its food problem, both the grubs contained in many of the acorns and the meats of sound acorns being utilized as food.

2. There are indications that grubs are the chief objects of consideration and are eaten first after the new crop is garnered, while the meats of sound

*Mr. Frank Stephens (*California Mammals*, p. 88) mentions that although the Anthony Gray Squirrel does not hibernate neither does it seem to "store up much food for winter use". Can it be that pillage of acorns stored by the California Woodpecker is a real factor in enabling this squirrel to live without either hibernating or food storing? The question certainly deserves looking into carefully.

Since the above was written the Museum of Vertebrate Zoology has received a piece of trunk of *Q. douglasii* (fig. 1) from near Gilroy, Santa Clara County, California, in which acorns of the same oak are stored, many of which protrude as did those described above. This specimen was taken in October, 1920, and as the acorns are of this year's crop, not much time could have elapsed in which they could have been preyed upon by other animals. However, gray squirrels are said not to inhabit this locality. Consequently the nuts would not be in danger from this animal at least.

nuts are mostly eaten after no more wormy acorns remain in the stores. But the observations pointing in this direction are too scanty to prove the suggestion.

3. The acorn storing operation is seemingly confined to a rather brief period immediately following the ripening of the acorns each year. The nuts seem to be picked up mostly from the ground soon after they have fallen, though they may be taken from the trees to some extent. The acorns used in this locality are chiefly those of the black oak, *Quercus kelloggii*.

4. Although the entire store, consisting of several thousand acorns on some storage trees, may be used up during a season, it may also happen that thousands of sound nuts in other trees are left unused and spoil from weathering and other destructive processes of nature.

5. Suggestions as to the origin of the hole-drilling part of the habit are found in the way holes are sometimes still connected with cracks in the wood of old dead trees. Also there is some indication that hole-drilling in the bark of pine trees was originally done in pursuit of insects inhabiting the bark itself. The fact that acorns are sometimes placed in cracks and decay cavities of dead trees suggests that this sort of storage may have preceded and led to storage in holes made expressly for the reception of the nuts.

6. But whatever may have been the origin of either the hole-drilling or the nut-storing habits, there can be no doubt that now the holes in the bark of living pine trees at least are mainly purposeless except as storage places for acorns, and that nearly all the storing is in holes made for no other purpose.

7. The acorns stored by woodpeckers are subject to plunder by nut-eating rodents, presumably squirrels and possibly brush rats.

8. As to what light these observations throw on the general problem of the efficiency of instinctive activity, the following conclusions seem justified, the facts here presented being taken along with others made known by other observers.

(a) As to hole drilling: While the holes are made expressly for the reception of acorns, many holes are probably made which are never used, holes are made at seasons of the year when there are no acorns to store, and large numbers of perfectly serviceable holes seem to be abandoned even in localities where both birds and acorns are abundant, and new holes are being made.

(b) As to the storing business itself: While this is of distinct service to the food necessities of the woodpeckers, the instinct sometimes goes wrong to the extent of storing pebbles instead of acorns, thus defeating entirely the purpose of the instinct. Again, large numbers of acorns are sometimes stored, the use of which is so long delayed that the acorns become wholly or largely unfit for food, and this in places where the bird population seems normal. Finally, acorns are sometimes stored in such fashion as to make them easy prey for marauding rodents, when with some definite foresight and a little more work such exposure could easily be largely avoided.

(c) From the facts, and the conclusions based immediately upon them, it seems justifiable to conclude finally that the acorn-storing habit of this woodpecker, though having much of specifieness about it, is still at bottom a rather generalized one and perhaps on this account frequently exhibits serious mal-adaptations.

Scripps Institution for Biological Research, La Jolla, California, November 19, 1920.

SUGGESTIONS REGARDING THE SYSTEMA AVIUM

By RICHARD C. McGREGOR

THREE IS NEED of a good check list of the birds of the world. The lists now available are out of date, and for other reasons none of them was ever satisfactory for general use.

A world list should include features that are not found in any list so far issued. Of first importance is the sanction of an international body, so that the ornithologists of all nations will feel a personal interest in the publication. It is therefore necessary that an international body adopt rules of nomenclature that will be acceptable to the majority of working ornithologists. The various groups should be willing to compromise their differences of opinion on minor points for the sake of uniformity in nomenclature. The usefulness of Sharpe's Hand-list is injured by slight differences between the American and the British rules.

Of next importance is the selection of a small representative committee that shall prepare a list with reasonable speed. A large part of the list can be made from existing lists and from monographic works. Little time should be spent upon the validity of newly described species, but they should all be included. When reasonable doubt as to the validity of a species exists, its name might be included in the synonymy, printed in distinctive type or indicated by a conventional sign. Completeness and speed in the preparation of such a list are far more important than final decision with regard to species based on slight or imaginary characters.

To win the place that it should have and hold, our list must be well handled typographically. Dubois's list is well prepared in some ways, but its usefulness is almost destroyed by the poor selection of type faces and the cumbersome size of the page. Sharpe's list avoids these bad features, but is injured by the maddening arrangement of its indices and by the lack of references. The first part of Mathew's list of Australian birds, in Birds of Australia, is confusing because of his method of treatment of subspecies.

A convenient type measure is 24 by 40 picas, printed on paper of 6 by $9\frac{1}{4}$ inches. This is the size of the Check-list of North American Birds. A little larger type page, such as that used for the Proceedings of the United States National Museum and many other United States Government publications, might well be used. This page measures 26 by 46 picas on paper of 6 by $9\frac{3}{4}$ inches, untrimmed. The paper should be light and thin, so as to reduce bulk and weight. The matter of type, both as to size and face, should receive careful consideration. Accepted names of species and genera should be printed in a heavy-face type. Gothic type is very clear, but is somewhat too harsh and stiff for our purpose. Clarendon is often used, but in the usual fonts is too much condensed. Antique seems to me the most suitable face for generic and specific headings, and is the most pleasing mate for standard roman.

The names of species and the notes on distribution should be set in 8 point type, synonymy in 6 point, both leaded, with extra space above flush lines. The use of these small type would save much space, and as more names would appear on each page, a required name would be more easily found.

Generic names should be repeated before their respective specific names, as in the American list; this is a great help, especially in large genera in which

the species run over from one page to another. Serial numbers for families, genera, and species, as in Sharpe's Hand-list, seem to be of no value whatever. A continuous series of numbers for all species, as in the American list, is convenient for marking eggs and in making lists of exchange specimens. Additional names can be numbered by the decimal system.

The value of our world check list will be much more increased, if it contain some synonymy for each species. This synonymy should include reference to the original description or basis of the name; reference to the accepted combination, if different from the original; reference to a few monographic works or faunas containing full synonymies—for example, the Catalogue of Birds of the British Museum and Ridgway's Birds of North and Middle America; reference to a good plate or to such other illustration as exists. The synonymy for most species would not run over two or three lines and would seldom be over six lines. The information contained therein would be well worth the space.

In Sharpe's Hand-list there are approximately 22,000 genera and species, listed on 2,066 pages in five volumes. It ought to be possible to put the world list, including the index, in five volumes of 500 pages each. The pagination should be continuous, so as to simplify the indexing.

I am disappointed to notice comment to the effect that a new edition of the Check-list of North American Birds is to be prepared "which should constitute the nearetie volume of the proposed 'Systema Avium' to be gotten up by the B. O. U. and the A. O. U. jointly." This idea does not at all fit my conception of what is needed. We should have one check list to include all the genera and species of the world in systematic order, so that one list will come to be used by ornithologists the world over.

The members of a national organization, such as the American Ornithologists' Union or the British Ornithologists' Union, probably think that it is beyond the province of their society to consider the status or the nomenclature of exotic species of birds. If this be true, and I do not undertake to contest it, then there is need of an international society or committee that shall consider the nomenclature of the birds of Timbuctoo with the same interest as that of the birds of the San Francisco Bay region, the District of Columbia, or the British Isles.

The interest of the student should not stop at an international boundary line. That a species is not known to occur north of the Rio Grande is a poor reason for barring a specimen from the cabinet of an American ornithologist. However, the American list tends to bring about this absurd discrimination against all foreign species to the detriment of the individual student. In other words, the majority of American ornithologists are extremely provincial with regard to birds. Fortunately Mr. Ridgway's stupendous work on the birds of North and Middle America and the activity of a few other Americans in their study of South American birds will help to break down this artificial barrier.

European ornithologists seem to have been keener in the study of exotic faunas and floras than have Americans. With the British there have been two very efficient causes leading to this condition. In the first place the birds of the British Isles had been studied and named for years before there was an ornithologist in North America. In the second place Britain's overseas territorial interests have thrown English naturalists into exotic fields, and their collections have helped to build up the magnificent series in the British Mu-

seum of Natural History and in the National Herbarium at Kew.

Another factor in developing a cosmopolitan interest among British ornithologists has been the Catalogue of the Birds in the British Museum. In this enormous work all of the specimens of each species in the British Museum were listed, and so its title is justified; but fortunately the catalogue not only lists the specimens of birds in the British Museum, but also gives synonymies and descriptions of all known species. This series of volumes must have been a great influence in attracting donations of specimens to the British Museum.

The publication of the Catalogue of the Birds in the British Museum unavoidably took many years—the first volume was out of date and out of print before the final volume was issued. Sharpe's Hand-list remedies this to a certain extent. With the aid of the Zoological Record and other review publications it is now reasonably easy to keep posted on the new genera and species as they are described. In this connection the reviews in the leading ornithological journals are important, and it should not be forgotten that the review section of the Auk is one of the most accurate in recording new generic and specific names.

Sharpe's Hand-list, through motives of economy perhaps, is not nearly so useful as it might be. Here is a list reduced to almost its lowest terms so far as information goes. With better typographical arrangement it could have been printed on fewer pages with no loss in clearness. Its gravest defect is the lack of primary references. For nine-tenths of the generic and specific names Sharpe gives no other reference than the Catalogue of Birds; for names of more recent date, the original references are given. To add to the difficulty of locating the subject of search in the index, each volume has separate pagination. Dubois produced a two-volume list with continuous pagination and primary citations for species. In spite of these advantages the large page of the Synopsis Avium has probably prevented its more general use. Aside from Sharpe and Dubois, no one has attempted a world list in recent years.

If such a work is to be printed, it should be completed and placed on sale with reasonable expedition so that it can be used. It is impossible to get a list of this sort so that it will suit everyone. Probably we shall never agree as to the limits of *Larus*, *Charadrius*, *Ochthodromus*, *Anas*, *Tringa*, *Ammodramus*, *Lanius*, *Ptilopus*, and dozens of other genera. Let the committee steer a middle course and neither a lumper nor a splitter be, for in this way will the need of the greatest number be served.

An international committee might take such a list as Sharpe's, revise the nomenclature and distribution notes, add synonymies and new species, and thus produce something that all the world could use.

Of course such a list would be imperfect and would contain many mistakes, but it would give us some confidence in the names accepted, which cannot be said of some of the numerous genera and subspecies that have been described in various publications. I do not mean that I object to the discussion and description of new genera and species. However, it is often impossible to judge of the validity of these new forms. Here is where a committee on nomenclature has its field of action. If I have the necessary specimens, I can satisfy myself as to the validity of the new forms proposed and will accept or reject the names as I think best. As the matter stands, however, one author unites several genera that have been long recognized, and another separates them again and creates a few new generic names. In such a case, lacking suitable material

for several of the species, I am at a loss to know which author to follow. If a committee that has a reputation for good judgment and fairness passes on the case, I will follow its ruling.

The American Ornithologists' Union Committee rulings do not always agree with my ideas, but were I writing on United States birds I would follow the American Check-list.

The Union has furnished an immense stimulus to the development of ornithology in the United States and has been a drag on wild and unreasoning publication. It does not seem impossible that an international union or committee could exert a similarly desirable influence on systematic ornithology in all countries.

Another salutary effect of an international list would be to show local students that some of the genera with which they are familiar contain related species in neighboring countries.

In the Manual of North American Birds and in the Birds of North and Middle America, Ridgway includes some species on the above basis; this should be considered a highly commendable feature of this author's remarkably thorough work. The preparation of the manuscript for such books involves an immense amount of study of related species, and Mr. Ridgway fully realizes that the study of birds should include all birds, not only a lot of species selected because of geographic or political divisions. Although, because of mechanical considerations, the species treated in one work must be limited in some way, every opportunity should be given the beginner to realize so far as he can the relation of his local species, genera, and families to those of the world at large. Few of us could afford to possess the twenty-seven volumes of the Catalogue of Birds, even were none of them out of print or out of date; but a useful check list of the birds of the world could be sold at a price within the reach of many students. Such a work would go far to dispel the provincialism of which I complain and would bring about a better understanding and a greater spirit of coöperation among the ornithologists of the world.

It is easy to describe the kind of list that one would wish to see published, but its preparation involves an immense amount of labor by the men who are generous enough to undertake it.

Bureau of Science, Manila, P. I., October 14, 1920.

A HUNTER'S NOTES ON DOVES IN THE RIO GRANDE VALLEY

By ALDO LEOPOLD

SINCE 1917 I have kept a record of weights, food, plumage, habits, and percentage of squabs of about 400 Mourning Doves (*Zenaidura macroura*) killed during the hunting season in the central Rio Grande Valley near Albuquerque, New Mexico. The data has been plotted to show percentage of squabs killed at weekly intervals from August 16 to December 15, and also the average weight, old birds and squabs separately, for the same period. The data is as yet insufficient as a basis for smoothed curves, but it is sufficient basis for tabular expression as follows:

Date	Percentage of squabs	Weight old birds	Weight squabs
Aug. 16	10%
Aug. 23	15
Sept. 1	55	4.4 oz.	3.7 oz.
Sept. 8	60	4.3	3.6
Sept. 15	50	4.2	3.5
Sept. 23	50	4.2	3.4

The table shows first of all that there are few squabs abroad on the shooting grounds until September, and that therefore the old opening date of August 16 was too early. It shows that the present opening date of September 1 is biologically correct. The explanation of the rapid increase in squabs about September 1 appears to be as follows: The main crop of squabs stays near the nests in the cottonwood bosques and in the foothills, until well grown. The adults, however, make long flights to wheat stubble, where most of the August shooting used to be done. This August stubble shooting was wrong, because it killed mostly birds with dependent young.

The table shows secondly that after the main squab crop has issued forth, the young birds are just as numerous, or slightly more so, than the adults. *The yearly increase is therefore about 100%.* This conclusion is nearly inescapable, because there are no other factors that I know of which would prevent the proportion of squabs in the bag from pretty accurately reflecting the proportion of squabs in the whole dove population. The only possible sources of a differential proportion of squabs would be: (a) Selection in shooting. Nearly all these birds were killed in pass and jump shooting, and the young birds are practically as hard to hit and to kill as the old ones. (b) Wildness. The squabs may "lay" a little better than the old birds, but on the usual clear days in normal cover both lay good enough to prevent an abnormal percentage of squabs in the bag. (c) Distribution of young and old birds. The data covers a wide variety of sites, seasons, hours, feeds, etc., and there could be no differential from these sources. (d) Differential migration. The general accuracy of the conclusion above stated could be impaired only by assuming a differential migration of young as compared with old birds. There is some evidence to show that the grown squabs of the main crop go south before the late squabs and old birds (see decrease in average weight of squabs and percentage of squabs during September). However, to admit this as material to the question of yearly increase would raise rather than lower the estimated annual increase of 100%, and it seems nearly incredible that a bird which lays only two eggs could more than double its numbers each year. In fact, even the 100%

increase implies a high percentage of second broods and re-nestings. That second broods and re-nestings are common is strongly indicated by the evidence available. For instance, I found a dove brooding eggs near Tucson, Arizona, on September 1, 1916; I have also found numerous eggs and fledglings near Albuquerque in August. Many very small squabs are killed very late in the season.

The table shows that the weight of old birds decreases slightly after September 1. This is probably accounted for by food habits. As already stated, the old birds congregate on the wheat stubbles in August and there fatten rapidly. But these stubbles are generally plowed under about September 1, at which time the birds move to the doveweed patches along the foothills, mesas, and other sandy ground. The seed of the doveweed (*Psoralea*, sp.?), is preferred above all other food, except possibly wheat and beeweed (*Peritoma serulatum* and *P. breviflorum*). However, during backward years the doveweed seed is often not matured by September, and the birds must seek the hottest banks to find mature seed. In any event, feeding on doveweed requires more work and longer flights to water, which probably accounts for the loss in weight. During the winter the few birds that remain are found in wild sunflower patches, where they eat sunflower seed, or around old strawstacks, where they pick up waste wheat. During pinyon years doves are very fond of pinyon nuts. J. F. Mullen counted 60 nuts in one crop and H. B. Hammond counted 72 in another. Pinyon nuts occur only at three or four year intervals.

The decreasing average weight of squabs shown by the table is plainly due to the fact that as the birds grow scarcer in September, the hunter must seek his birds instead of waiting on a flyway, or flush-shooting a doveweed patch. In doing this he hunts groves and trees, thereby killing many small late squabs not yet big enough to migrate. Such few big squabs as are killed during the later part of the season weigh nearly as much as the old birds; in fact, by November, squabs are mostly indistinguishable from adults.

The dove has several habits, as a game bird, which I have never seen described in print. High, fast-flying birds, especially on a stormy day, may often be induced to pitch down and light by firing a shot at them. A dove merely winged will fall down and walk away, but will not seek cover like other wounded birds. A dove with body wounds will not even walk. A certain kind of wound (probably lungs) results in the bird flying away and alighting on the ground or in trees in nearly natural manner, but when found the bird is stone dead. This manner of death is much commoner with doves than with any other game bird I know of. Many hunters do not watch their "missed" birds carefully, and this accounts for the large number of dead doves found on the shooting grounds. Head shots tower spirally, with sudden collapse, like quail.

What are the doves' natural enemies? I do not think they have as many as quail, else they could not double yearly on two eggs, but I think hawks get quite a few. On November 23, 1919, near Tome Hill I saw a Sharp-shinned Hawk (*Accipiter velox*) catch an apparently healthy grown dove in a cornfield. I killed the hawk, and found the fresh blood and dove feathers on his claws, but could not find the dove. Two or three Marsh Hawks wheeling over a doveweed patch will sometimes flush many birds and cause them to flee to trees, but one Marsh Hawk does not worry them much. I never saw a Marsh Hawk actually pursue a healthy bird.

The dove is a temperamental bird. On certain days the doves do not feed,

but gather in trees and just sit around. On such days all birds show a decreased weight, doubtless directly due to empty crops. When scattered over the open mesas feeding on doveweed, a rainy day interferes with their feeding. They simply sit around under the lee side of bushes, keeping dry. Nevertheless they make their regular evening flight to water although it would seem easy to gather the necessary water off the stems and leaves of plants. On such days the birds killed on the flyways to water show decreased weight due to empty crops.

The daily flight to water generally starts between 3:00 p. m. and 4:00 p. m. and reaches its height just before dark. Sometimes, where long distances must be traversed, the birds do not arrive at water until after dark. When the wind parallels the water flight, the flight going and coming will be at different levels; for instance with the wind blowing toward water, the birds going to water will fly high and with tremendous speed, while the birds beating their way back against the wind will fly so low as to be nearly hidden by ordinary sage-brush. Some hunters take advantage of this and shoot only the easy birds beating into the wind.

The dove's choice of watering places is peculiar. In the hills they like springs, stock tanks, and open sandy creeks. On the Rio Grande bottoms they use waste irrigation water spilled along open roads, grassy vegas provided the cover is short, and ponds with bare shores. It is generally supposed that they seek freedom from cover which might harbor natural enemies, but if this is the main factor governing their choice of watering places, then the shallow rills on the big open sandbars of the Rio Grande ought to suit them exactly. But I have never seen a dove light on a river sandbar. Here is an interesting problem to solve.

Many doves are killed yearly in New Mexico but no decrease in numbers is noticeable. The area adapted to doves is so enormous that the total population is probably very little affected by localized shooting.

Albuquerque, New Mexico, October 13, 1920.

CONCERNING THE STATUS OF THE SUPPOSED TWO RACES OF THE LONG-BILLED CURLEW

By JOSEPH GRINNELL

(Contribution from the Museum of Vertebrate Zoology of the University of California)

IN THE FALL of 1918 vertebrate collecting was carried on by a party from the California Museum of Vertebrate Zoology at Morro, San Luis Obispo County, California. Among the birds of interest obtained there was the series of Long-billed Curlew listed in the table presented farther along in this paper. The acquisition of so many specimens (fifteen) of this Curlew, taken from one locality and within a period of less than one month in a single year, seemed to afford ground for looking into the standing of the recently proposed two races of the species, namely *Numenius americanus americanus* Bechstein and *Numenius americanus occidentalis* Woodhouse. This separation was first pro-

posed by Bishop (Auk, xxvii, 1910, pp. 59-60) and was subsequently upheld by Oberholser (Auk, xxxv, 1918, pp. 188-195) and by Ridgway (Bds. N. and Mid. Amer., pt. viii, 1919, pp. 390-395). There is some question as to the name to be employed for one of the supposed races (*parvus* of Bishop versus *occidentalis* of Woodhouse), but this is a matter outside of the purpose of the discussion in the present contribution. I am here enquiring as to the nature of the variation I find in the series of Curlew from the one place in California. Is there represented geographic variation, in other words subspecific variation, as well as individual and sexual variation?

Referring further to the material under scrutiny: All the birds are in comparable plumage, as far as I can see. Wing and tail feathers are in no case so abraded as to leave margin for appreciable differences in measurements due to wear; in fact most of the plumage throughout is fresh. Molt of the body plumage is plainly in progress in all of the specimens, but the primary flight feathers, at least, have all been completely renewed at some not far remote time.

There is, of course, a strong probability that both old adults, more than one year old, and young of the year, are included, the latter in majority. But after some study, I have been unable to tell from any condition of the specimens, which are old and which young. They all look alike. Of course there might be some difference in length of bill due to age; on the other hand, since the bill is, in the curlew, of prime importance as a food-getting instrument, it may acquire its full proportions in the individual very promptly, as with the bill of a duck. It seems likely, therefore, that as regards measurements of bill, also, all the specimens (taken in September and October, four to five months old at youngest) are perfectly comparable. Age, then, is a factor which can safely be eliminated.

MEASUREMENTS (IN MILLIMETERS) AND WEIGHTS (IN GRAMS) OF FIFTEEN SPECIMENS OF *NUMENIUS AMERICANUS*, ALL FROM VICINITY OF MORRO, SAN LUIS OBISPO COUNTY, CALIFORNIA

Mus. No.	Sex	Date (1918)	Collector	Wing	Tail	Culmen	Tarsus	Weight
29645	♂	Sept. 21	J. Dixon	256	95.2	124.2	79.0	653.7
29649	♂	Sept. 22	J. Dixon	248	103.3	152.3	89.7	684.8
29650	♂	Sept. 22	J. Dixon	265	108.5	133.1	82.7	745.7
29651	♂	Sept. 28	J. Dixon	264	101.2	136.1	83.1	686.0
29653	♂	Oct. 1	J. Dixon	261	103.3	125.2	80.9	669.1
29654	♂	Oct. 1	J. Dixon	273	106.3	129.7	86.2	791.6
29658	♂	Oct. 6	H. G. White	260	107.6	129.8	81.0	620.0
			Average	261.0	103.6	132.9	83.2	692.9
29644	♀	Sept. 19	J. Dixon	286	106.0	201.7	89.1	838.0
29646	♀	Sept. 21	J. Dixon	275	107.1	159.6	87.8	833.0
29647	♀	Sept. 22	J. Dixon	280	106.4	161.4	87.7	902.0
29648	♀	Sept. 22	J. Dixon	290	108.6	177.6	91.2	873.0
29652	♀	Sept. 29	J. Dixon	291	203.0	93.5	951.1
29655	♀	Oct. 2	J. Dixon	290	106.2	164.8	87.9	630.0
29656	♀	Sept. 19	J. Grinnell	277	107.0	168.2	87.2	768.0
29657	♀	Sept. 25	H. G. White	272	99.6	170.2	85.5	730.0
			Average	280.5	105.4	175.9	88.7	815.6

Another important consideration is that none of the birds was taken on its breeding grounds. Morro Bay is 440 miles from the nearest point (Butte Valley, Siskiyou County, California) at which the Long-billed Curlew is known to have nested. But the species is now extinct there, and probably does not breed nearer to Morro than Malheur Lake, eastern Oregon, 530 miles away. Thence the species breeds to a maximum distance of about 1400 miles to the northeast, in southern Alberta, and to the same distance to the east, in Oklahoma and Texas. The California birds are all migratory, and come from some point in the breeding

range of the species within the limits above indicated. I have no present means of knowing what exact point or what general portion, even, of this breeding range the specimens taken come from, unless these birds can be shown definitely to possess subspecific characters as set forth for the two races claimed to be recognizable. This, then, becomes the special object of my enquiry.

In their diagnoses of the supposed two races of *Numenius americanus*, Bishop, Oberholser and Ridgway (places cited above) assign characters as follows:

	<i>americanus</i>	<i>occidentalis</i>
Bishop: (1910)	size larger bill much longer	size "smaller" bill "much shorter"
Oberholser: (1918)	size "larger" bill "particularly" longer wing "particularly" longer	size "decidedly smaller" bill "particularly" shorter wing "particularly" shorter
Ridgway: (1919)	size larger bill longer	size "smaller" bill "especially" shorter

No features of coloration have been ascribed; so that the differentiation of the two forms rests upon "size" (apparently as judged only from chord of closed wing) and, more particularly or especially, upon length of bill. It is obvious, therefore, that carefully ascertained measurements of an adequate number of comparable birds, are essential to determining the meaning of the variation shown in the species.

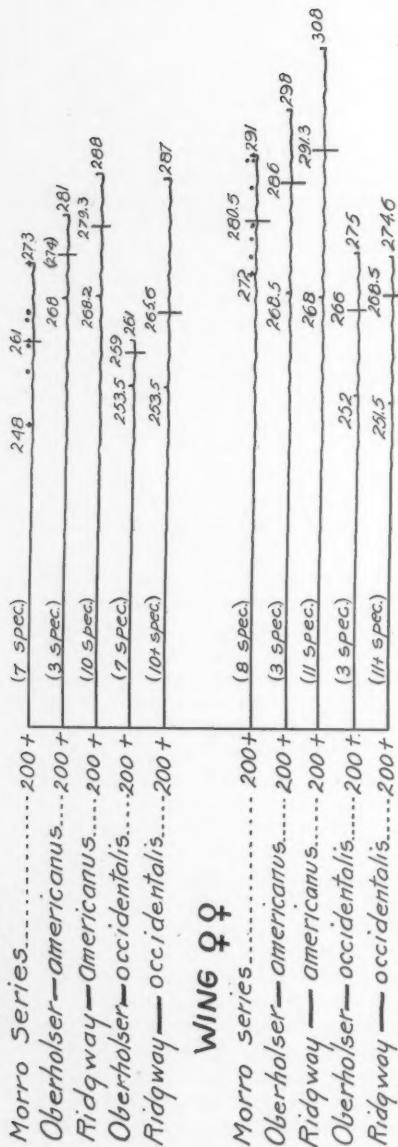
The measurements given by all the authors cited are those of wing, tail, exposed culmen, and tarsus. Bishop gave also length (total) and extent (spread of wings) of the type of "*parvus*" (= *occidentalis*); but these two dimensions are useless in the present study of the case.

Bishop measured a total of 13 males and 10 females representative of the two races he wished to differentiate as well as of intermediates between the two. Analysing Bishop's figures, which he gives in inches and hundredths, we find average and extremes given for 7 males and 3 females of unequivocal "*parvus*" (*occidentalis*) and for just 3 males and 3 females of unequivocal *americanus*.

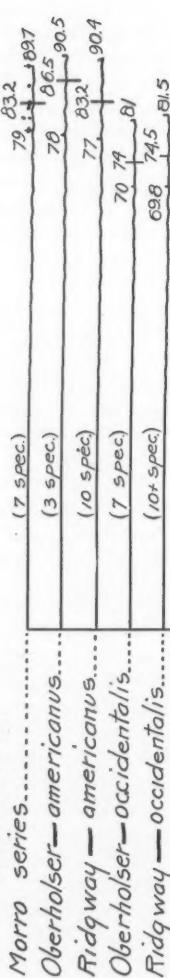
Turning to Oberholser's review of the problem, the first impression received is that the main object of this writer was to advance a nomenclatural point, namely, to raise the name *occidentalis* of Woodhouse to replace Bishop's *parvus*. There is no question, however, but that he thoroughly endorses the proposed division of the species. Oberholser says: "In this connection we have examined a total of 279 specimens". And yet, to the reader's inescapable astonishment, all of the measurements given by him are merely those of Bishop's sixteen birds "transposed into millimeters"! Not only does the validity of the two races depend upon definitely ascertained measurements, but also does the identification of the individual specimens so depend. Yet the localities for every one of the specimens are given with seeming exactitude under one name or the other. Moreover, the majority of these localities, to judge from the accompanying dates, are for migrants!

In the interests of accuracy in systematic ornithology I am compelled to point out this extraordinary lapse on the part of the author cited, in not giving original measurements of series of comparable specimens. This lapse vitiates all Oberholser's conclusions in regard to the ranges of the two alleged races, particularly as to the fall, winter and spring when the birds are more or less off their breeding grounds. The reader will recall here the well-known custom of a few systematists (Bishop, at least, included) of diagnosing individual speci-

WINGSPAN



TARSUS ♀♂



TARSUS ♀♀

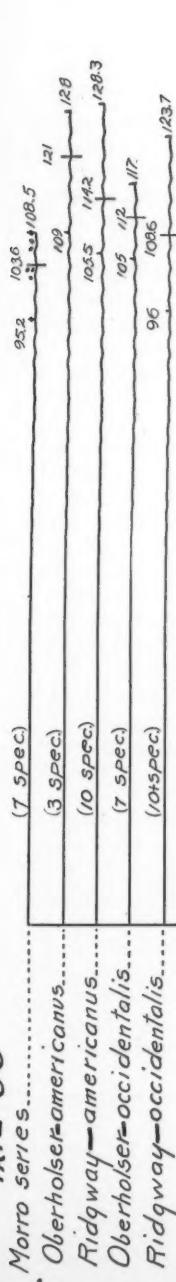


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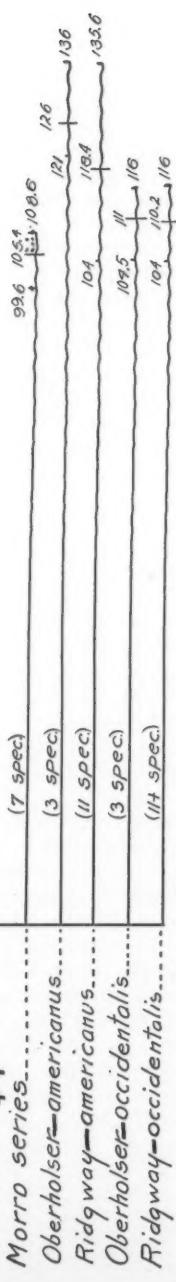
Jan., 1921

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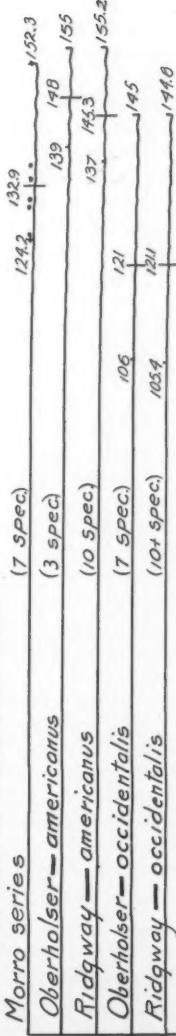
TAIL ♂♂



TAIL ♀♀



EXPOSED CULMEN ♂♂



EXPOSED CULMEN ♀♀

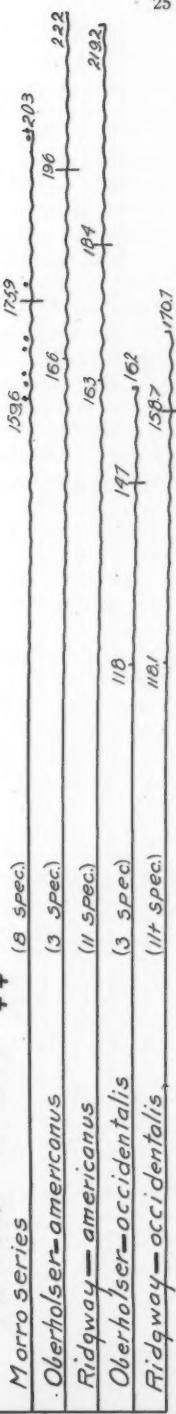


Fig. 6.

mens, where two or more subspecies may be concerned, on the basis of manifest characters irrespective of the probability of immediate blood relationships. In other words, an extreme of individual variation in one subspecies may be diagnosed as belonging to another subspecies. Great danger of coming to wrong conclusions in regard to distribution in general and routes of migration in particular will inevitably result from such interpretation. Far better to leave migrant examples, of equivocal appearance, undetermined as to subspecies. In the case of the Curlews in question the subspecific distinctions claimed are at best only average, and the characters involved pertain to only one or two dimensions. How, then, can Oberholser, or anyone else, say of the majority of individuals taken in migration (when there are no geographic probabilities to regard) which are *americanus* and which are *occidentalis*? And yet Oberholser lists *every specimen* under one head or the other!

As to Ridgway's measurements, he gives his own, of 21 specimens of *americanus* and of a somewhat "larger" number of *occidentalis* (so stated [footnote, p. 394], but not definitely specified because measurement sheets had "been mislaid"). Averages and extremes are presented. It seems quite likely that Ridgway simply followed Oberholser's lead as to the validity of the separation.

I would now call attention to the accompanying graphic exhibition of the measurements of the Morro series in comparison with the measurements of the two alleged races as given by Oberholser and by Ridgway. The dimensions given are of wing, tail, tarsus and exposed culmen; in each case the dimensions are given graphically, natural size, that is, on a scale of 1 to 1. All the measurements of the Morro series were taken by myself. The figures for the graphs were checked back and forth with the kind assistance of Mr. Halsted G. White; and the graphs themselves were drawn and lettered by Mrs. St. E. Abernathy. An enquiry as to the meaning of these graphs (figs. 5 and 6) is in order, and some very curious things come of it.

As to wing.—It is to be seen that, while Oberholser's and Ridgway's averages for *americanus* and *occidentalis* do not coincide, the amount of difference involved is close, namely, 6 and 5 percent, respectively, in males and 7 and 9 percent in females. Individual variation is such that overlapping of measurements takes place broadly in all cases except that of Oberholser's males of *americanus* and *occidentalis*, between the nearest extremes of which there is a hiatus of about 6 mm. Ridgway's longest winged *occidentalis* is within one millimeter of being as long as his longest *americanus*.

Referring to the Morro series, it is to be seen that in the males the average falls with *occidentalis*. Yet with the females it falls nearer *americanus*. (Some one may suggest that here is an instance of differential sex migration!) The individuals will be seen to be scattered along pretty evenly, without any obvious tendency to bi-modal grouping.

As to tail.—The differences here between the measurements given of *americanus* and *occidentalis* vary from 6 to 14 percent. The amount of overlapping of extremes is very irregular. The Morro series, both males and females, will be seen to fall with *occidentalis*; minima show even lesser figures. As Ridgway has pointed out (tom. cit., p. 391, footnote), there is a likelihood that differences due to method of taking the length of tail are involved.

As to tarsus.—The percentages of difference between averages of *americanus* and *occidentalis*, as given by Oberholser and by Ridgway, and for the two sexes, range from 6 percent to as much as 17 percent. Yet there is fully 50 percent

overlap when extremes are considered. The Morro series will be seen to fall into an intermediate position as to males, the average and mode both a little closer to that of *americanus*; while as to females it falls unequivocally with *americanus*.

As to culmen.—The shortness of the bill in *occidentalis* as compared with *americanus* is the feature of difference which has been emphasized most. It will be seen that this difference varies from 16 to 33 percent, on the basis of the smaller, according to sex and measurer. The amount of overlapping of extremes is small, even lacking in the case of Oberholser's figures for females (though here, it will be noted, only three individuals of each race were measured). The Morro males average almost exactly between the averages for *americanus* and those for *occidentalis*; the greater number of individuals, however, are grouped below the minima for *americanus* and nearer the average for *occidentalis*. The Morro females are also intermediate, the average a trifle nearer *americanus*, but the mode preponderantly nearer *occidentalis*. Most clearly, there are not two modes so that a person could say definitely that part of the individuals fall with *americanus* and part with *occidentalis*.

Conclusions.—The effort to identify the fifteen examples of Long-billed Curlew from Morro with one or the other of the two supposed races fails absolutely. There are no color features whatever to go by; and as to average of all measurements the series in question falls into an intermediate position. Yet individual variation is so great that extremes, in one respect or another, of both "*americanus*" and "*occidentalis*" are included. Because of the lack of any grouping of individuals near these extremes it is impossible to allocate the specimens under one head or the other. This fact militates against the hypothesis that both of the supposed races are represented.

Another hypothesis to be considered here is that the Morro birds, being migrants, are from a breeding ground of intermediate geographic position, so that the characters are of intermediate average and the individual variation of wide range and bringing "mosaic" behavior of characters. But the measurements of breeding birds so far published are so very few and the manner in which they are presented so unsatisfactory that nothing conclusive can be inferred on this score.

While the evidence presented by Oberholser and Ridgway points toward a tendency of northern bred Long-billed Curlew to be smaller than southern bred birds, the present writer is unconvinced that the amount of this tendency is great enough to warrant recognition in nomenclature. He proposes, therefore, that, at least until a more thorough demonstration to the contrary is forthcoming, the name *Numenius americanus*, without any subspecific divisions, be employed as designation for not only all the Long-billed Curlew of California, but for all those of North America.

The reader is invited to study the accompanying actual-size graphs and see what conclusions he will come to independently.

Berkeley, California, December 8, 1920.

NOTES ON SOME SPECIMENS IN THE ORNITHOLOGICAL
COLLECTION OF THE CALIFORNIA
ACADEMY OF SCIENCES

By JOSEPH MAILLARD

AMONG the specimens in the research collection of the Department of Ornithology of the California Academy of Sciences are some of especial interest either by reason of their rare occurrence in this state (California), the particular locality in which they were taken, the date of capture, or on account of their exhibiting some unusual characteristics. The recent publication from the University of California Press, entitled "The Game Birds of California", by Messrs. Grinnell, Bryant and Storer—a splendid contribution to California ornithology in its particular line, and most painstakingly up-to-date at the time work was stopped upon it—is the criterion by which the value of many of these records has been determined. Although the existence of much of this record material in the Academy's collection was known to these authors, they did not, at the time they were working upon this book, consider it as being available to them. The following records, then, seem to be of sufficient value to be worthy of note.

Mergus serrator Linnaeus. Red-breasted Merganser. While this species is a common winter visitant along the sea coast of California it has been but seldom recorded from the interior of the state. The Academy collection contains one such specimen, a male, taken near Merced, Merced County, California, on January 10, 1878.

Lophodytes cucullatus (Linnaeus). Hooded Merganser. This species of merganser was formerly frequently seen in California, occurring as a fall and winter, or even spring, visitant in small numbers on various marshes, small streams, and ponds in many localities, though probably rarely or never in numbers. In recent years it has become scarce and is seldom reported. Its peculiar appearance has led hunters to shoot it on every occasion, which is a way with the gunning fraternity, "just to see what it looks like." Its flesh is also fairly good eating, so that this species is in line for extinction along with many others, unless carefully guarded. There are two specimens in the Academy collection, a male taken near Los Baños, Merced County, January 4, 1909, and a female from Lakeport, March 12, 1908.

Anas platyrhynchos Linnaeus. Mallard. The collection contains a fine series of this species, in many plumages, but the only one to be specially noted here is a partially albino female, taken near Los Baños, Merced County, on September 1, 1908.

Anas, sp? No. 12581, C. A. S. collection, is a female duck taken near Los Baños, Merced County, California, October 7, 1908, which is labelled *Anas fulvigula*, and so catalogued. The specimen, however, does not entirely conform to the description of that species, although approaching it to a considerable degree. This specimen may be described as follows:

Top of head in color like that of female *platyrhynchos*, but the feathers are rounded and dusky with edges narrowly buffy, the buff making a sort of fine crescent on each feather and creating a scaled appearance, whereas in *platyrhynchos* the feathers of the head are long and narrow with the nearly black centers in strong contrast to the broadly marked buff edgings, giving an appearance of dark, longitudinal streaking, with the buff quite prominent. Malar region buffy and whitish, with narrow dark brown or dusky streak, as in *platyrhynchos*. Throat and chin buffy white, lightest on throat, some of the feathers being buffy with distinctly whitish tips. Lower down on the throat, and corresponding to the position of the white neck ring of the male *platyrhynchos*, is a patch of white, about 15 mm. in width, extending approximately half way around on

each side of the neck, making a kind of semicircle that is somewhat broken by the intrusion of light buffy feathers. Breast a tawny brown, as deep as that of a female *platyrhynchos* in July plumage but with the dusky centers of the feathers much more restricted, paler, and showing much less contrast with the brown edgings.

The abdomen and sides correspond more nearly to those of the Mottled Duck (*Anas fulvigula maculosa*), there being considerable lighter tipping to the already light brown feathers, which all have, however, the blackish brown spot near the tip. This lighter brown, almost white, tipping is not at all regular although all the feathers seem to be of the same molt—that is, they are new feathers—giving the abdomen a slightly mottled appearance other than that caused by the blackish-brown spotting. The back is much like that of the Black Duck (*Anas rubripes*), with a distinctly purplish tinge to the larger feathers of the posterior portion and also to the scapulars. The speculum is bluish green, with a white border formed by the narrow white tips of four or five of the greater wing coverts, except for the bluish cast corresponding to that of *fulvigula*. The upper tail coverts are brownish black, with tawny tips, while the under coverts are dusky, with narrow, whitish-buff tipping. The four middle tail fathers are blackish brown and the remainder lighter colored, with pale buff edgings. The lining of the wings is mostly white.

Both bill and feet are so darkened by age and drying that the finer distinctions of color are not sufficiently discernible to be of much value in the determination of this specimen. Its general appearance and markings show it to be closely related to the Mallard (*Anas platyrhynchos*), while its peculiarities connect it with either the Florida Duck (*Anas fulvigula fulvigula*), or the Mottled Duck (*Anas fulvigula maculosa*). The green speculum with whitish border looks very much like that of *fulvigula*, but in the spotting and mottling on the abdomen there seems to be shown resemblance to *maculosa*, although it is possible that this latter characteristic in this specimen may be merely individual and not inherent. It might not show this spotting and mottling in a different state of plumage, or later in the season.

The measurements of this specimen are as follows: Total length (taken in the flesh), 26.0 inches (660.4 millimeters); extent 38.5 in. (976.9 mm.); wing 11 in. (279.4 mm.); tail 4.7 in. (118.6 mm.); exposed culmen 2.15 in. (54.6 mm.); depth of bill at base .88 in. (22.5 mm.); greatest width of upper mandible .92 in. (23.3 mm.); tarsus 2.26 in. (57.6 mm.); middle toe, without claw, 2.26 in. (57.5 mm.).

Mareca penelope (Linnaeus). European Widgeon. The Academy collection contains a male of this species taken near Los Baños, Merced County, on December 5, 1908, by R. H. Beck. The European Widgeon has been taken occasionally in this state in years gone by, according to reports, but is becoming more and more rare as time goes on. There are very few California specimens in collections, but there are probably some mounted birds in private hands throughout the country. This bird is commonly mistaken for a cross between the Baldpate and some other species, the Cinnamon Teal being usually the accredited party of the second part.

This specimen in the California Academy of Sciences is in nearly full winter plumage, but still retains a few feathers that are remnants of either the post-nuptial or juvenal plumage. It differs from the description given in Ridgway's Manual of North American Birds, p. 95, as follows: There is a complete circle around the head, including forehead, lores and chin, contiguous to the base of the bill and extending posteriorly for about 15 mm., that is of a pale rusty coloration, spotted with dusky, and distinctly noticeable. Such a marking as this is not mentioned by any authority I have as yet seen, and may be only an individual variation. The measurements of this specimen are: Wing, 263 mm.; tail, 95 mm.; exposed culmen, 32.4 mm.; depth of bill, 18.0 mm.; width of bill, 15.5 mm.; distance from nostril to tip of bill, 24.4 mm.; distance from nostril to lores, 8.9 mm.; tarsus, 36.4 mm.; middle toe, without claw, 38.2 mm.

Marila marila (Linnaeus). Scaup Duck. This species is an irregular yet not uncommon winter visitant to California, but it occurs almost altogether along the coast. The Academy collection contains, however, one specimen recorded from the interior, a male taken near Los Baños, Merced County on January 25, 1909, and two others which are rather late seasonal records, having been taken in Alameda County on May 20, 1903.

The measurements (in millimeters) of these three specimens are as follows:

C. A. S. No.		Locality	Date	Wing	Tail	Exposed culmen	Depth upper mandible	Width upper mandible	Tarsus	Middle toe
13178	♂	Merced Co.	Jan. 25, 1909	212.1	59.2	44.9	19.8	25.4	38.6	57.9
11754	♀	Alameda Co.	May 20, 1908	badly worn	58.4	43.2	19.3	25.1	43.2	58.9
11755	♀	Alameda Co.	May 20, 1908	204.5	55.9	40.1	17.8	23.9	38.1	56.4

Marila collaris (Donovan). Ring-necked Duck. This is another rather rare species in this state, being seldom recorded nowadays, of which there are several specimens in the Academy collection, two males and six females, all taken near Los Baños, Merced County, in the months of October and November, 1908, and January, 1909.

Harelda hyemalis (Linnaeus). Old-squaw. A male in the collection was taken on December 13, 1911, near San Rafael, Marin County, California, a rather unusual place to find this species.

Grus canadensis (Linnaeus). Little Brown Crane. While this species seems to be much the more common of the two representatives of this genus in the state, both of which appear to be losing ground though protected by law, there are but few California specimens to be found in collections. Hence the Academy is fortunate in having ten specimens of *canadensis*, all of which were taken in Merced County. Those labelled only "Merced Co." were all taken by R. H. Beck, who had his headquarters at Los Baños in that county, and the presumption is that they were all obtained in that vicinity. On account of the scarcity of available specimens from California the measurements of the ten are given herewith.

C. A. S. No.		Locality	Date	Wing	Exposed culmen	Depth of bill at base	Tarsus	Bare portion tibia	Middle toe with claw
13213	♂	Merced Co.	Mar. 23, 1909	479	94.0	22.1	184.0	72.1	71.1
13211	♂	Merced Co.	Mar. 23, 1909	504	101.6	26.4	218.4	75.2	72.6
13212	♂	Merced Co.	Febr. 18, 1909	495	113.8	27.2	213.4	71.4	66.0
13214	♂	Merced Co.	Febr. 18, 1909	463	95.5	24.9	180.0	69.6	58.4
13661	♂	Merced Co.	Apr. 26, 1909	476	98.2	26.6	196.0	71.6	66.8
13215	♀	Merced Co.	Mar. 23, 1909	475	98.5	23.1	192.0	66.5	61.5
13216	♀	Merced Co.	Feb. 22, 1909	480	92.9	22.4	191.0	65.2	72.6
13217	♀	Merced Co.	Feb. 18, 1909	444	91.2	25.4	186.0	65.4	58.9
22443	♂	Los Baños	Oct. 3, 1897	458	97.8	24.4	194.1	74.2	66.7
22444	♀	Los Baños	Oct. 3, 1897	474	95.4	21.8	212.2	66.5	70.9

There are also three specimens of *canadensis* from Alaska in the collection, none of the measurements of which exceed the above.

Grus mexicana (Müller). Sandhill Crane. At the present time this species is rarely met with in California and specimens from this state are also scarce in collections. In fact so scarce are they that the authors of "The Game Birds of California" (Messrs. Grinnell, Bryant and Storer) found only four skins, outside of the Academy of Sciences, for measurements and comparison. Since the date of publication of that work these have been added to the Academy collection, making eight specimens therein

from this state. The measurements of these are given herewith.

C. A. S. No.		Locality	Date	Wing	Exposed culmen.	Depth of bill at base	Tarsus	Bare portion tibia	Middle toe with claw
13207	♂	Merced Co.	Feb. 27, 1909	564	138	29.4	254	104	84
13208	♂	Merced Co.	Feb. 27, 1909	550	158	29.2	243	100	89
13209	♂	Merced Co.	Feb. 27, 1909	555	150	32.0	232	—	87
13210	♂	Merced Co.	Feb. 27, 1909	502	135	28.7	244	95	87
22438	♀	Merced Co.	Jan. 20, 1898	524	153	35.1	240	—	83
22439	♂	Merced Co.	Jan. 20, 1898	543	140	40.1	231	105	88
22440	♂	Merced Co.	Jan. 20, 1898	545	170	33.6	245	102	90
22441	♂	Merced Co.	Jan. 20, 1898	543	145	33.3	243	110	90

The first four of these were taken by R. H. Beck, while he was stationed at Los Baños, Merced County, and the last four were bought in the flesh in a San Francisco market, the seller stating that they came from near Los Baños. The measurement of the bare portion of the tibia is omitted in two specimens of *mexicana* for the reason that the bone seems to have been pushed up into the skin in each case in such manner as to make the measurement misleading.

In *The Auk*, vol. xxxv, 1918, p. 204, among the proposed changes in the American Ornithologists' Union Check-List is that set forth by Dr. L. Brasil (Brasil, Genera Avium, xix, 1913, p. 4) to make *Grus mexicana* a subspecies of *G. canadensis*, but no reasons are given in either place cited for this change in status. While we have no large series of these two species in the Academy we are at least fortunate in having in the collection some fifteen specimens of *G. canadensis* and eight of *G. mexicana*, a large enough number from which to make fairly reasonable averages of measurements. Brasil states that in *G. canadensis* the tarsus is always less than 220 mm. and in *G. mexicana* always more than 250 mm., and gives these measurements as the distinction between the two forms; yet, as they do not overlap, no intergradation is shown.

While none of the examples of *canadensis* in the Academy, nor a number in the Museum of Vertebrate Zoology, University of California, reach the 220 mm. maximum of Brasil, several of the *mexicana* come under his minimum of 250 mm. for that species, even going as low as 231 mm. As the matter now stands it seems as if further evidence would be necessary to make a convincing case of such intergradation and few of us will accept the conclusion reached by Brasil until more and clearer evidence is placed before us.

Steganopus tricolor Vieillot. Wilson Phalarope. This phalarope is known to breed in favorable localities in northern and northeastern California from the Lake Tahoe region north, and occurs during the spring and fall migrations in other places, mostly inland. It has been casually reported as breeding at Los Baños, Merced County, but has never been actually recorded as doing so. There is, however, a nest in the Academy collection that was taken in the vicinity of Los Baños, Merced County, by R. H. Beck, on June 22, 1908, and contains four eggs with incubation noted as "advanced". The identity given is "♂ shot". While there is nothing on the label denoting that this is the parent of this set, no. 13471, C. A. S., is a male bird taken on that date in that locality, and the only one taken on that day. So it is fair to assume that it is the parent. On the data blank of this set, after a description of the nesting site, are the following words: "3 or 4 pairs probably nesting, tho found no young later on." In 1907 and 1910 Mr. Beck took specimens in June and July at or near Los Baños, so it would seem as if this species bred there regularly.

Macrorhamphus griseus scolopaceus (Say). Long-billed Dowitcher. While this species is a common spring and fall migrant through California along the coast and in the valleys west of the Sierras, there are in the collection several specimens from Alameda County, taken between April 4 and May 30, and between July 9 and 20. The former are unusually late spring records and the latter interesting as being taken actually in the summer season.

Tringa canutus Linnaeus. Knot. The latest date of occurrence of this comparatively rare migrant during the spring migration in this state that has been recorded is May 10, as given in "The Game Birds of California". There are, however, in the Academy collection a number of specimens of adults of this species taken in Alameda County, supposedly on the San Francisco Bay shore, between May 10 and 24, a male and two females having been taken on the latter date. The plumages of these specimens are in all stages between winter and breeding.

Pisobia maculata (Vieillot). Pectoral Sandpiper. There are very few records for California of this species and the two males taken by R. H. Beck near Los Baños, Merced County, on September 15 and 18, 1908, and a female from Point Sur, Monterey County, taken by E. W. Gifford on September 9, 1911, add materially to the meager list of occurrences.

Ereunetes mauri Cabanis. Western Sandpiper. This species is an abundant spring and fall migrant along our coast and to a certain extent in the interior as well, wintering from San Francisco Bay southward. The return movement from its northern breeding grounds has been usually recorded as reaching the latitude of San Francisco toward the end of July, but there are many specimens of both sexes in the Academy collection taken as early as July 13 to 15, all adults from Alameda County, and four males from Monterey taken July 16. Incidentally there are numerous juveniles taken in August.

Totanus flavipes (Gmelin). Lesser Yellow-legs. The Academy is singularly fortunate in having seven specimens of this bird of California take, as there are but nine other occurrences recorded within the state's borders. Of the seven, one male and one female were taken on September 21, two males and two females on October 6, 1908, near Los Baños, Merced County, and one male on August 19, 1907, on Monterey Bay. As this species can only be distinguished from its close relative, the Greater Yellow-legs, by its smaller size, and as both species are wary and difficult to approach sufficiently close to admit of positive identification, the Lesser Yellow-legs may have occasionally been mistaken for the commoner form. It is probably not as rare a migrant in this state as absence of records would imply, and a systematic and continued search for it in proper localities would in all likelihood develop this fact.

Numenius americanus Bechstein. Long-billed Curlew. In "The Game Birds of California" this species is mentioned as occurring in the San Joaquin Valley throughout the year, but is not recorded as breeding there. The Academy collection contains specimens from Merced County, taken in July and August. The above authority also gives it as migrating southward along the California coast in July, and says that these birds ". . . do not seem to reach inland spots such as the shores of San Francisco Bay until August or September . . ." This statement is rather contradicted by the presence in the collection of a male taken in Alameda County, July 15, 1910, and two females from the marsh at Alviso, Santa Clara County, taken on July 27, 1909.

Aegialitis semipalmata (Bonaparte). Semipalmated Plover. This bird is a very common migrant along the coast of California and there are abundant records. Among the specimens in the Academy collection, however, are several which help to determine the time of arrival in the San Francisco Bay region of the south-bound migrants from their breeding ground in the north. Most of the published records of this species at this period of migration are from southern California, but there are two females in the Academy taken in Alameda County, on July 13, 1909, and several in early August.

Archibuteo lagopus sancti-johannis (Gmelin). American Rough-legged Hawk. There is one specimen of this rare visitant to this state in the collection, this being a male taken near Los Baños, Merced County, on December 1, 1908.

Most of the above records were made by R. H. Beck and E. W. Gifford at times when they were occupied in collecting more or less steadily in one spot, and they clearly prove that protracted observations in suitable localities would result in many additions to our geographic and seasonal records for the state of California.

San Francisco, California, November 27, 1920.

FROM FIELD AND STUDY

Range of the Plain Titmouse in Oregon.—In the *Auk* (xxxvii, 1920, p. 594) Mr. W. F. Henninger records the Plain Titmouse (*Baeolophus inornatus inornatus*) as a new bird for the state list of Oregon. In looking over the available literature I was surprised to see that this species had not hitherto been mentioned (except in Bailey's *Handbook of Birds of the Western United States*, 1914, p. 456) as a common resident in the south-central part of the state. Its occurrence there has long been known to ornithologists. I have found it common at Grants Pass (November 30), Rogue River (October 4), Gold Hill (March, April and May), Medford (June, 1916), and Ashland (June, 1916). We therefore have a continuous line of records from Grants Pass on the north to within a few miles of the California line on the south. Specimens were taken by the writer at Grants Pass, Rogue River and Gold Hill during the spring of 1916, and I have seen several skins from Medford and Ashland. The species is common in the scrub-oak forests of the region along Rogue River and its tributaries in the lower valleys. So far as known it does not occur in the Douglas fir forests to the east or west of the valley.—STANLEY G. JEWETT, *Portland, Oregon, November 10, 1920.*

California Woodpecker Steals Eggs of Wood Pewee.—It is common knowledge that the jay is not the only egg eater among our birds. On occasion birds of many other species rob nests. The worst egg eater yet discovered in my aviary is a Santa Cruz Song Sparrow. The following note adds the California Woodpecker to the list of guilty birds.

While riding horse-back about a mile west of the village in Yosemite Valley, on July 17, 1920, my attention was attracted to a pair of Western Wood Pewees who were snapping their bills and making a great fuss. On looking above my head, I discovered a California Woodpecker (*Melanerpes formicivorus bairdi*) calmly perched on the pewee's nest and eating one of the eggs. I could see the white and the yolk of the egg on the woodpecker's bill, as he raised his head. After watching for some time, I attempted to frighten the robber away, but experienced considerable difficulty in doing so. When he finally left the nest the pewees continued to dart at him, to drive him farther away. Soon one of the pewees, apparently the female, returned to the nest, picked up an egg-shell and flew off with it. I was unable to see what she did with it. In half a minute she returned and began incubating the remaining eggs.—HAROLD C. BRYANT, *Berkeley, California, November 10, 1920.*

Late Nesting of the Green-backed Goldfinch.—While working around my place on November 1, last, I was attracted by the notes of a Green-backed Goldfinch (*Astragalinus psaltria hesperophilus*) and upon investigating found two young in a nest, ready to leave. On November 2 the birds had gone and I could not locate them.—W. LEE CHAMBERS, *Eagle Rock, California, December 6, 1920.*

Speed of Flight of the Red-shafted Flicker.—In the forenoon of November 1, 1920, I was driving a motor car on the main highway going north out of Fresno. We were making just 30 miles an hour on a level, straight road. The throttle was set and the speedometer was registering the speed very accurately under these conditions. A few miles north of Fresno a Red-shafted Flicker (*Colaptes cafer collaris*), flying from our right, attempted to cross the road about 100 feet in front of us, but upon arriving at the center of the road turned north and flew ahead of us for two-tenths of a mile, keeping about fifteen feet above the road. My guess is that the bird was surprised and, thinking itself pursued, made the best speed it could. We did not change our speed nor did the flicker change its course, and we overtook and passed under the bird in two-tenths of a mile. There was a little wind from the west but not enough to affect the speed of flight. The weather was fair and had been for several days. Evidently the bird was making only 27 miles an hour and flying as fast as it could. While there is no way of proving that the flicker was flying at top speed, the circumstances made me think it was. One of these birds was given a speed of 25 miles an hour when flying parallel with

an automobile but apparently not in front of it (Wetmore, *CONDOR*, xviii, 1916, p. 112). These facts are some indication that flickers when not pressed fly very nearly as fast as they do when making their best speed.—CLAUDE GIGNOUX, Berkeley, California, December 6, 1920.

The Bendire Thrasher Nesting in California.—On April 11, 1920, I was collecting on the Mohave Desert near Victorville, California, with Mr. Selwyn Rich, a fellow member of the Cooper Club. He had the good luck to discover a nest with four eggs, incubation just started, of the Bendire Thrasher (*Toxostoma bendirei*). Unfortunately we were unable to collect the bird, but as the eggs were typical of this species there was little doubt left in our minds as to their correct identity. I substantiated our views, when, on April 26, 1920, in the same general locality, I took a similar set, with the female parent.

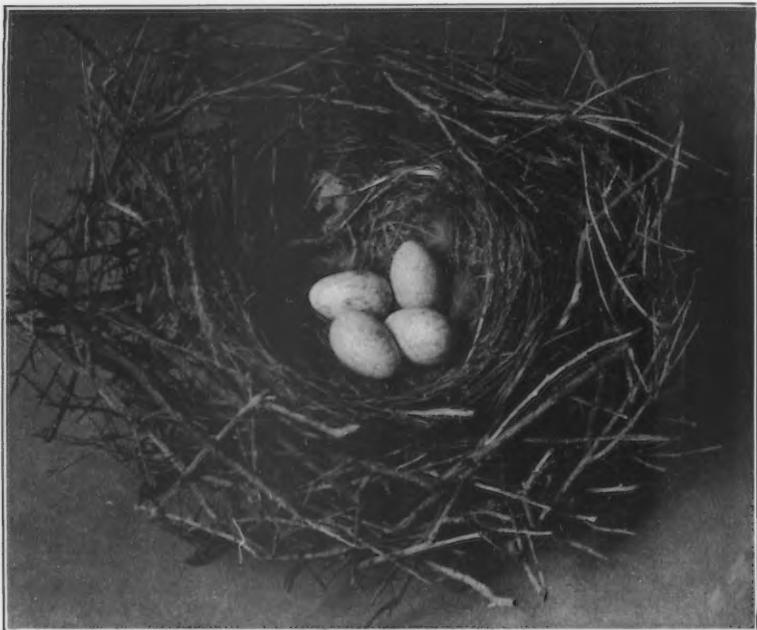


Fig. 7. NEST AND EGGS OF THE BENDIRE THRASHER; TAKEN NEAR VICTORVILLE, MOHAVE DESERT, CALIFORNIA; APRIL 26, 1920.

The nest in each case was about four feet up in "cholla" cactus, and in each instance the bird was extremely wary.

The main body of the nest is of sticks, and there is a well shaped cup, lined with fine grasses, weed stems, soft weed bark, a little rabbit fur and some cottony material (see fig. 7).

This adds another to the few records of the Bendire Thrasher in California, and it is, I believe, the first nesting record for the state. The bird collected is no. 1984, coll. W. M. P., and the sets of eggs nos. 1235, and 1266, coll. W. M. P.—WRIGHT M. PIERCE, Claremont, California, October 4, 1920.

Unusual Late Summer Birds in the Yosemite Valley.—There is a wider dispersal of nesting birds during August and September than at any other time of year. During

these months birds that habitually nest at lower elevations migrate higher into the mountains. Some worth-while evidence in this regard was obtained this summer in the Yosemite Valley, by keeping a daily bird record. Following are a few notes on the "erratic stragglers" that drifted into the Valley during the last few days of July and the months of August and September, 1920.

The first bird of this class to appear was the California Jay (*Aphelocoma californica*). One lone bird was seen on July 26, in the meadow near old Camp Ahwahnee. From this date until September 11, when they were last seen, the birds were found in this locality on every visit. Their numbers increased here, yet they were never seen in any other section of the Valley. On the morning of August 26, ten were counted.

The next wanderer to appear was the Black Phoebe (*Sayornis nigricans*). An individual of this species was first noted July 28. By August 5, there were a number of phoebes scattered along the stream within a mile of the village. One of these appeared one hundred yards above the Sentinel Bridge, selecting a dead stump which stood out of the river as his favorite perch. This bird held down the last patrol; no other phoebe was found up stream beyond this point. During the month of August and the first two weeks in September, phoebes were fairly common along the river below the village. Gradually their numbers decreased and on September 25 the Black Phoebe was noted for the last time.

On August 18, a Western Kingbird (*Tyrannus verticalis*) was discovered in the meadow below the village. When first seen he was perched on a pile of dry sticks. He flew often, diving into the dry grass for grasshoppers. By moving cautiously, the bird was approached to within twelve feet, and identification was made positive. This meadow was visited on several following days, but the bird was not seen again.

On the morning of September 4, in the meadow of our many bird adventures, a solitary White-rumped Shrike (*Lanius ludovicianus excubitorides*) was noted. Two days later the bird was again seen. This time we were able to approach within six feet of it. It was a handsome bird in full plumage and a clear view of its distinct rump patch was obtained.

A pair of English Sparrows (*Passer domesticus*) were noted September 2, in the barnyard at "Kinneyville".

August 29, a flock of fifteen California Bush-tits (*Psaltriparus minimus californicus*) was seen in the Kellogg oaks on the north side of the Valley. Again, on September 8, a small flock was seen. On September 12, a flock was seen in Illilouette Canyon, three thousand feet above the Valley floor.

On September 28, while we sat eating lunch, a strange bird flew out of the wild coffee bushes and lit in the branches of a Kellogg oak some twenty feet above our heads. We both thought it a waxwing. The actions of the bird were right, but the silhouette was a trifle off—the head did not appear to be crested. The strange bird sat quietly until a flicker flashed by, then, as though frightened, it crouched and sidled along the branch just as waxwings do when crowding together on a limb. In the course of a half hour the bird came three times to the coffee bush. The first two trips it stopped some distance away. As it pulled off berries, with its back towards us, we could plainly see two distinct white streaks, one on either side of the rump. The last time the bird came down from the oak we were able to get within six feet of it, and to identify it as a Bohemian Waxwing (*Bombycilla garrula*). We were greatly surprised to see the Waxwing swallow eight large coffee berries in the few minutes that he stayed in the bush.

Many other interesting birds were seen during our stay in the Valley, some that passed through in early spring on their way to the higher country, and birds that were driven down into the Valley during storms.—CHARLES W. MICHAEL and ENID MICHAEL, *Yosemite, California, March 10, 1920.*

The Harlequin Duck in the Yosemite Valley.—On arriving in Yosemite, on June 1, I was informed by Mr. and Mrs. Charles Michael that a pair of Harlequin Ducks (*Histrionicus histrionicus*) had been seen along the Merced River, near the Sentinel Hotel, on May 11 and May 26. On June 4, Mrs. Amy M. Bryant watched a pair of Harlequins for some time as they swam about in the river, and as they preened their feathers while perched on an old log. The birds were observed by other visitors in the Valley on several different occasions.

During July the birds were apparently absent, until July 21, when a female was discovered feeding in a gravelly riffle about one-fourth mile east of the Sentinel Bridge. The water was only three to four inches deep and the current strong. The bird seemed to be industriously turning over the rocks to obtain food between and beneath them. Often she was wholly immersed for from six to ten seconds by count. At the end of about ten minutes she drifted down the river and dove several times in still water. In the afternoon about 5:45, this female Harlequin returned to the same feeding ground and was watched again. For full half-hour it continued feeding in the same manner, continually ducking its head under the swift current and always working up-stream.

Apparently the Harlequin does not procure all of its food by diving, but at times feeds in shallow water. The occurrence of these birds during the nesting season and the disappearance of the male during the middle of the summer would indicate nesting of the species in the Valley or close at hand, but no direct evidence in this regard was secured.—HAROLD C. BRYANT, *Berkeley, California, November 10, 1920.*

Distribution of the Townsend Fox Sparrow.—In studying Swarth's *Revision of the Avian Genus Passerella* (Univ. Calif. Publ. Zool., vol. 21, 1920, pp. 75-224), the attention of the writer was drawn to some apparently erroneous conclusions of the author regarding the migration and distribution of *Passerella iliaca townsendi*, particularly as to its winter range.

On page 145 of the paper under discussion, Swarth states "The Townsend fox sparrow is a notable example of a bird with a winter habitat nearly as sharply defined as its summer home." On page 105 he states further that "*townsendi* in turn leap-frogs over *fuliginosa*", the breeding bird of the Puget Sound and Vancouver Island region, the impression being given here and by the map on the following page that the "sharply defined" winter habitat of *townsendi* lies entirely south of that of *fuliginosa*. The author further, on pages 145-146, calls the attention of the reader to the apparently discontinuous distribution of *townsendi* in the southern part of the Alexander Archipelago. The 1909 Alexander Expedition failed to find it at the localities visited in that region, but Swarth (*loc. cit.*) mentions the fact that it is known to be a common summer visitant to Forrester Island, near the southern extremity of the archipelago, and records summer specimens taken by other collectors at Howkan and Wrangell.

The following data from notes of the writer, accumulated during six summers (1914-15-16-17-19-20), and one winter (1919-20), spent in the region under discussion, fill some of the gaps noted by Swarth and modify some of the conclusions which he reached. The greater part of the six summers were spent on Forrester Island, but occasional short visits were made at this season of the year to nearby points on Dall and Prince of Wales Islands. During the winter of 1919-20 the writer resided at Craig, Prince of Wales Island, but frequent trips were made to nearby sections, to Suemez, Dall and Long Islands, and to other points on Prince of Wales Island.

That the Townsend Fox Sparrow breeds more plentifully on Forrester Island than at any other point in the southern end of the Alexander Archipelago is very true. But that it fails to breed on Prince of Wales, Dall and Long Islands, the writer doubts. Although the 1909 Alexander Expedition failed to find it in the region in summer, the writer has found it at that season at Craig and Waterfall, Prince of Wales Island, at several points on Dall Island, and at Howkan, Long Island, and, though no occupied nests were examined at these points, several nests entirely typical of the bird were noted in the fall.

On Forrester Island the species was always present at the time of the writer's arrival, the earliest date being April 21 (1915). In this locality probably fifty nests were examined during six summers. The majority of the eggs are laid between May 20 and June 20, extreme nesting dates being April 29 (1915), a nest with one fresh egg, and July 9 (1916), a nest with three eggs.

During the latter part of August there is apparently a movement up the sides of the mountains, and for some time after this date *townsendi* is quite rare near sea-level. This movement is shared to a considerable extent by the Varied Thrush (*Ixoreus naevius*) and Oregon Junco (*Junco oreganus oreganus*), the three species being frequently found in close proximity in the woods on the mountain sides from about 1000 feet altitude to timber line. As the weather becomes cooler they work back down the mountains to the shore. At Craig, in 1919, the Townsend Sparrow became common in

woods along the beaches by October 9, and remained so throughout the following winter. In fact, in this locality it proved to be a much more common bird in winter than in summer. Numerous specimens were taken during the winter months but few toward spring, as at this latter season they become so fat as to be difficult of preparation.

The fact that this bird winters commonly at the southern end of the Alexander Archipelago must necessarily modify Swarth's definition of its winter habitat in Oregon and northern California.—GEORGE WILLETT, Wrangell, Alaska, November 1, 1920.

The Nuptial Flight of the Allen Hummingbird.—The description of the nuptial flight of the Anna Hummingbird (Hunt, CONDOR, XXII, p. 109) has prompted me to offer an account of the mating antics of the Allen Hummingbird.

On the afternoon of April 16, 1920, I was walking through the hills back of the Claremont Club golf links when I was brought to a halt by a rather prolonged buzzing sound, very penetrating and metallic in quality, somewhat similar to the sound produced by drawing a fine-grained file over the edge of a piece of sheet steel with a sudden jerk. Looking in the direction of the sound I saw poised in the air about twenty-five feet from the ground, a male Allen Hummingbird (*Selasphorus allenii*), uttering his commonly heard mouse-like squeaks. Then followed the performance of the nuptial flight, similar to that of the Anna Hummingbird, though the path described in the air was somewhat different. He "rocked" back and forth over the female, which was perched on a twig of a low poison oak (*Rhus diversiloba*), describing a semi-circle about twenty-five feet in diameter. There was a pause at each end of the arc, and before the pause he spread his tail and shook his whole body so violently that I wondered how his feathers remained fast. During this time he continued uttering the characteristic squeaks. After several of these semi-circles were described he began his climb to a height of about seventy-five feet; and then came the "high dive". He swooped down with the speed of a comet, and on passing over the female gave the low-pitched but resonant buzzing sound which had first attracted my attention; then he curved upward and came to a pause about twenty-five feet in the air, where I had first seen him. The sound emitted on passing over the female was of a second or more in duration, and differed greatly from the instantaneous, metallic *clink* of the Anna Hummingbird.

Following the accompanying diagram in which X represents the female, he started at A, describing the arc AB with the violent shaking just before arriving at B. After a short pause at B (one or two seconds) he returned to C, repeating the shaking just before arriving, and again pausing. This much of the performance he usually repeated one or more times, thus describing several semi-circles from A to B and from B to C. The last time from C, instead of pausing he continued upward with a slow, heavy flight, describing spirals or undulations until he reached the top at D, when, without pause, he made the downward swoop, sometimes bringing up at E to recommence the whole performance, and at other times darting off to perch a few yards distant for awhile and then return.

Mr. Hunt states (loc. cit.) that he does not know whether the Anna Hummingbird adheres rigidly to the evolutions described or whether it varies them. I had the good fortune on the morning of March 15, 1920, at Washington Park, Alameda, to witness the nuptial flight of this bird and it was slightly different from his description. My bird, in making the long dive from c to d (fig. 27, loc. cit.) made a sudden jump of about six feet to the left at a point about opposite a, and then continued his downward swoop to d. Otherwise this performance was identical with that described by Mr. Hunt.—FRANK N. BASSETT, Alameda, California, September 2, 1920.

A Unique Visitor.—On the tenth day of October, nineteen hundred and twenty, at one o'clock in the afternoon, after two days of intermittent showers—some heavy, some light—a beautiful young gull landed on the woodpile in back of our cottage, which is

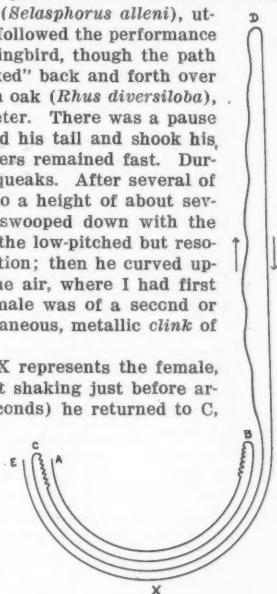


Fig. 8. DIAGRAM ILLUSTRATING THE NUPTIAL FLIGHT OF THE MALE ALLEN HUMMINGBIRD.

situated in a lonely canyon about thirty-two miles east of the Pacific. He appeared very hungry and tired, alternately feeding and resting. He violently shook and ate the head of a rabbit discarded by our collie; he mangled a hornet attracted by the rabbit, but suddenly decided not to devour it; he snapped at passing insects; he thrust his bill with such force into a cluster of white geraniums that the petals flew in fragments to the ground; he stalked under the fig trees, with his pale lavender-gray webbed feet, and tossed the figs about, though he did not seem to relish them especially. He circled the collie, who had been nonchalantly watching him, and would have alighted on her back if she had not flicked her ear. He appeared absolutely fearless, often walking within touching distance of our hands, and occasionally resting close beside us, partially shutting his eyes, and fluffing out his breast in drowsy content.

One hour he stayed with us, and in that hour I had ample opportunity to examine him minutely and identify him as a young Sabine Gull (*Xema sabini*). This identification was later corroborated by Dr. Grinnell, who added that the bird was "evidently in full juvenal plumage—a bird hatched last June". Then he lifted his beautiful wings and flew away, flew low, over the mesas and the sage-grown hillsides, flew toward the east in a faltering manner, as though he fain would return. Did our beautiful bird, Pearleclito (for so we named him), safely voyage over the chaparral?—MELICENT HUMASON LEE, *El Cajon, California, November 29, 1920.*

EDITORIAL NOTES AND NEWS

New Year's morning, Mrs. Amelia S. Allen, Secretary of the Northern Division of the Cooper Club, gave a reception to the Club at her home on Mosswood Road, Berkeley. The occasion was a pleasant one socially, and in addition there was an ornithological feature of remarkable interest. The bird feeding table just outside the large plate window of the dining room where breakfast was served to the human guests was continually patronized by numerous avian visitors. These latter represented some ten or more species—thrashers, thrushes, wren-tits, towhees, etc.—all wild birds, behaving normally. The differential lighting on the two sides of the window, darker within than without, doubtless in part accounted for the charming obliviousness of the birds. Within, the considerable company of people was able to observe the birds closely under most comfortable conditions, even to comment upon them freely in ordinary conversational pitch of voice, without alarming or distracting the principals in the nature play being acted outside.

Mr. Aretas A. Saunders, author of Avifauna No. 14 (Birds of Montana), now in press, has called our attention to an error in the postcard pre-notices of this publication sent out recently by our Business Manager. Mr. Saunders was for five years with the United States Forestry Service, and during two summers worked at the Biological Station of the University of Montana; but at no time has he been connected with the United States Biological Survey, as was stated.

Mr. and Mrs. Vernon Bailey are in camp for the winter in the foothills of the Santa Rita Mountains, Arizona (post office, Continental, Pima County). Their camp mascot is a Roadrunner who "comes regularly for spare mice".

We learn from Dr. T. S. Palmer that the meeting of the American Ornithologists' Union in Washington, D. C., November 8-11, 1920, was one of the largest in the history of the Union. One-half of the Fellows and about ten percent of the entire membership were in attendance. The business meetings were held at the Cosmos Club and the other sessions at the U. S. National Museum. The election of Fellows and Members included Mr. Robert Cushman Murphy of Brooklyn, N. Y., as Fellow; Mr. E. C. Stuart Baker and Dr. Percy Lowe of London, Honorary Fellows; and Mr. Ira N. Gabrielson, Dr. Loye Miller, Mr. Aretas A. Saunders, Prof. T. C. Stephens, and Prof. Myron H. Swenk, as Members in the restricted sense. The program of nearly 40 papers, five of which were illustrated by motion pictures, covered a wide range of subjects relating to North American birds and also included papers on the birds of Argentina, Nicaragua, Peru, Europe and Madagascar. In connection with the meeting an exhibition of drawings, paintings, and photographs of birds by American artists, supplemented by a series of prints showing the development of zoological illustration as applied to birds from the earliest times down to date, was arranged in the Division of Prints in the Library of Congress.

Dr. H. C. Bryant, Economic Ornithologist, California Museum of Vertebrate Zoology, and also in charge of Education, Publicity and Research, California Fish and Game Commission, left early in January in company with Dr. Loye Miller, Associate Professor of Biology, Southern Branch, University of California, to attend the State Parks Conference, at Des Moines, Iowa. After the Des Moines conference, a series of lectures were to be given by these naturalists in eastern cities to stimulate interest in a nature guide service for all the national parks. During the past summer, they organized the Nature Guide work in the Yosemite Valley, and at some of the Lake Tahoe resorts. This included trips afield and lectures, and was an attempt to satisfy the yearning of the summer vacationist for nature lore. Nature guiding in the Yosemite National Park proved so popular that there is likelihood that it will be made a permanent feature not only of the Yosemite but also of other national parks throughout the United States.

Mr. Allan Brooks is located at Jupiter, Florida, for the winter. He is occupying himself while there in making colored drawings of various waterfowl, particularly ducks, these to be used in illustration of books which are in preparation by certain eastern ornithologists. Mr. Brooks attended the A. O. U. congress in November, and for a time was the guest of Mr. L. A. Fuertes, at Ithaca, New York. Indeed, the two went to Florida together, the last-named for but a short stay. Later, Dr. L. C. Sanford joined Mr. Brooks. Mr. Brooks plans to return to his home in British Columbia late in April.

MINUTES OF COOPER CLUB MEETINGS

SOUTHERN DIVISION

OCTOBER.—Regular monthly meeting of the Cooper Ornithological Club, Southern Division, was held at the Museum of History, Science and Art, at 8:00 p. m., October 28. Members attending were: Mesdames Fargo, Martin, Terry, and Warmer; Miss Miller; Messrs. Dickey, Hornung, Howard, Howell, Miller, Pierce, Robertson, Van Rossem, Warmer, and Wyman. Mrs. Howard, Mrs. Schnelder, and Mr. Langdon were visitors.

Minutes of the September meeting were read and approved. On motion of Mr. Robertson the Secretary was instructed to cast an electing ballot for persons whose names were presented at that meeting. New presentations were: Harry Milton Wegeforth, M. D., 210 Maple St., San Diego, by W. DeW. Scott; John E. Overholzer, 6 West Main St., Morristown, Pa., by R. J. Middleton; Nathaniel A. Francis, 35 Davis Ave., Brookline, Mass., by W. Lee Chambers; Elbert Benjamin, 109 Coral St., Los Angeles, by Mary

Mann Miller; Mrs. John McB. Robertson, Buena Park, Calif., by John McB. Robertson; J. Thomas Fraser, Jr., 432 W. Hawthorne St., Eureka, by Lawrence Zerlang; Emmet Joy, San Andreas, by Ethel Crum; George C. Shupee, Box 964, San Antonio, Texas, by Antonio H. McLellan; Charles Springer, Cimarron, N. Mex., by J. Stokely Ligon; Webster H. Ransom, 708 West 20th Ave., Spokane, Wash., by Stanley Jewett; Miss Evelyn Kennedy, 232 W. Ave. 52, Los Angeles, by Roland C. Ross; Miss Elizabeth Burnell, 419 So. Olive St., Los Angeles, by L. E. Wyman; Regina Woodruff, Zool. Dept., Univ. Calif., by Dr. Olive Swezy; Clelia A. Paroni, 2430 Bancroft Way, Berkeley, by Dr. H. C. Bryant; John Thomas Waterhouse, Honolulu, T. H., by Annie M. Alexander; John Forbes Rickard, 250 Tunnel Road, Berkeley, and Mary I. Compton, 6510 1st Ave. N. E., Seattle, Wash., by Anna Head.

Routine business finished, Dr. L. H. Miller read a paper on the rearing of a pair of house finches which had come into his possession just after hatching. His account of their development and behavior was highly instructive as well as entertaining. The usual informal discussion and inspection of a series of hawk skins completed the session. Adjourned.—L. E. WYMAN, *Secretary*.

NOVEMBER.—Regular monthly meeting of the Cooper Ornithological Club, Southern Division, was held at the Museum of History, Science and Art, November 23, at 8:00 p. m. In the absence of both President and Vice President, Mr. Dickey was acclaimed Chairman of the evening. Members present: Messrs. Appleton, Bishop, Brouse, Brown, Chambers, Colburn, Dawson, Dickey, Edwards, Esterly, Hanaford, Howell, Hornung, King, Little, Pierce, Reis, Rittenhouse, Ross, Robertson, Suits, Taylor, Van Rossem, Wall, Wyman; Misses Atsatt, Burnell, Davidson, Kennedy and Pratt. Mesdames Bishop, Brown, Chapman and Dawson were visitors.

Minutes of the October meeting were read and approved, followed by reading of the minutes of the Northern Division for October. Applicants whose names were presented at the previous meeting were declared elected, on motion of Mr. Chambers that the Secretary be instructed to cast an electing vote. New presentations were: Hattie E. Shepherd, R. 1, Box 73, Redlands, and A. R. Shepherd, 457 Burchett St., Glendale, California, proposed by Frank N. Bassett; Roy W. Quillin, 1025 Summit Ave., San Antonio, Texas, proposed by O. P. Silliman. Elections of the Northern Division were approved.

An invitation from the Bird Lovers' Club to hold the January meeting jointly with them was voted upon favorably, but the Secretary was instructed to request that the date be deferred until February. Mr. Robertson moved that the Chairman be authorized to appoint a nominating committee of three; seconded by Van Rossem; carried. The appointees were Messrs. Brown, Van Rossem and Howell. Business Manager Chambers made the announcement that Avifauna No. 14, "The Birds of Montana", is nearly ready for mailing.

Serious business completed, Mr. Howell gave an interesting account of a 5000-mile automobile trip extending over a period of five months, in which he followed the line of spring from Los Angeles to Montana, returning via the western coast of Washington and Oregon. Followed an hour of general discussion and inspection of a series of hawk skins.

Adjourned.—L. E. WYMAN, *Secretary.*

NORTHERN DIVISION

OCTOBER.—The Northern Division of the Cooper Ornithological Club and the Northern California Section of the American Society of Mammalogists held a joint meeting in the Map Room of the University Library, October 28 at 7:30 p. m. The larger works on birds and mammals contained in the University Library were on exhibition and the evening was spent in looking over these books. At 9:30 p. m. a short business session of the Cooper Club was held, at which Mr. Wright presided. The following members were present: Mesdames Alexander, Allen, Florence Merriam Bailey, Blake, Bridges, Ferguson, E. Ferguson, Flynn, Grinnell, Kellogg, Kibbe, Law, Pringle, Roe, Thomson, and Wythe; Messrs. Vernon Bailey, Bell, Cooper, Dixon, Elmore, Evermann, Grinnell, Hunt, Kibbe, Law, McLean, Storer, Swarth, Wheeler and Wright. Visitors were Miss Ruth Dodge, F. E. and M. N. Garlough, Gillilan, Lamoneux, Mr. Blake, Mr. Bridges, and Mr. Steilberg.

The minutes of the September meeting were read and approved and were followed by the reading of the minutes of the September meeting of the Southern Division. Mrs. Georgianna T. Roe and Francis G. Gilchrist were elected to membership and elections by the Southern Division in September were approved. New names proposed were Dr. R. L. Ridgon, 1617 Broderick St., San Francisco, by Cornelia C. Pringle; Perry R. F. Marshall, 1495 W. Adams St., Los An-

geles, by J. Grinnell; J. W. McKibben, 2522 Piedmont Ave., Berkeley, by J. S. Cooper; and John William Stacey, 634 Powell St., San Francisco, by F. N. Bassett.

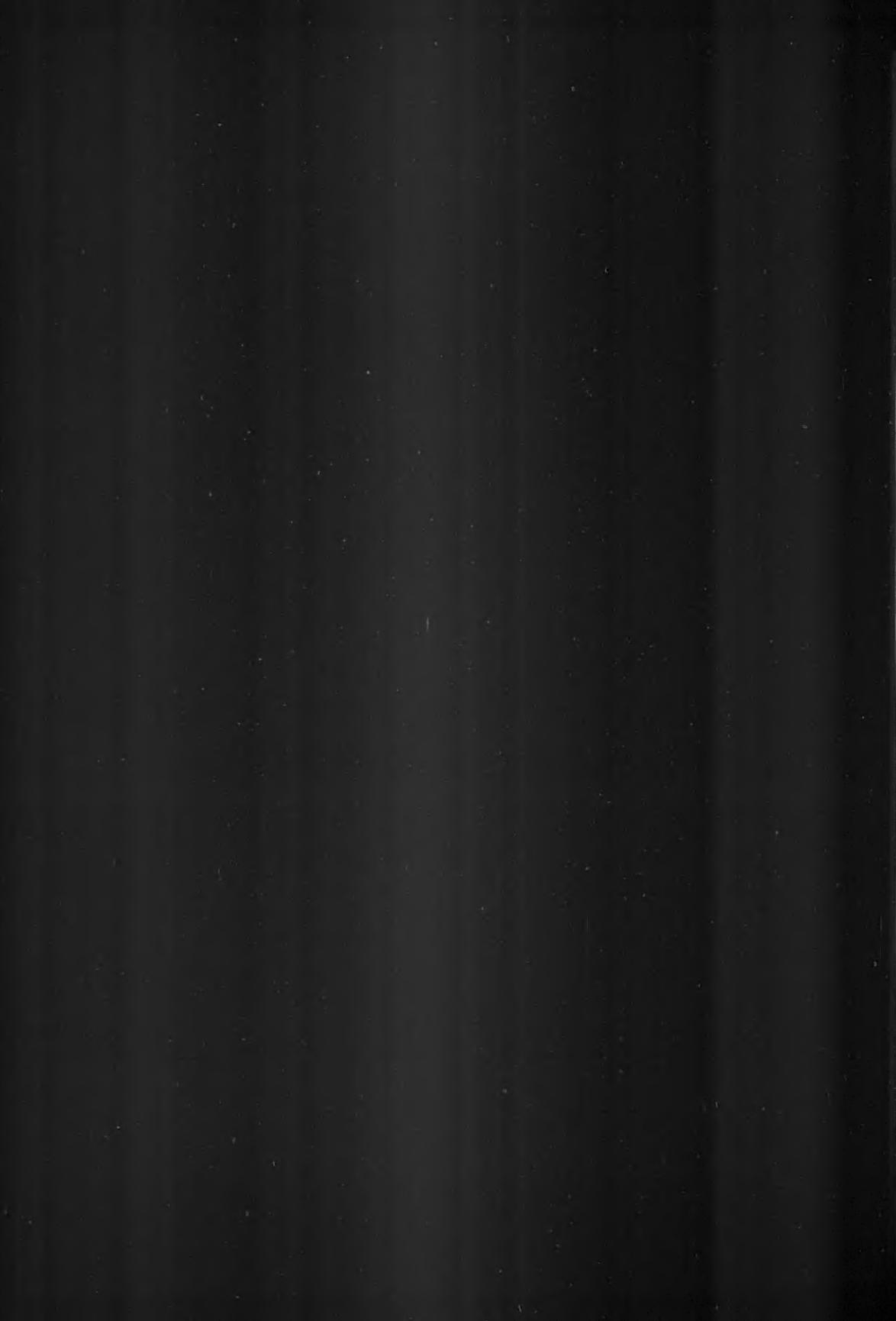
Adjourned.—AMELIA S. ALLEN, *Secretary.*

NOVEMBER.—The Northern Division of the Cooper Ornithological Club met at the Museum of Vertebrate Zoology, November 18, at 8 p. m. Pres. Wright presided, and those in attendance were: Mesdames Allen, Ayers, Bridges, Flynn, Hohfeld, Kibbe, Law, Meade, Newhall, Thomson, and Wythe; Messrs. Carriger, Cooper, Dixon, Gignoux, Gilchrist, Grinnell, Lastreto, Mailliard, McLean, Noack, Silliman, Storer, Swarth, White, and Wright. Visitors: Mr. and Mrs. Arnold, Mr. Bridges, Mrs. Caldwell, Mr. and Mrs. Clark, Miss Devendorf, Mrs. Heilman, Mrs. Hyde, Mrs. Noack, Prof. Price, and Miss Wythe. Minutes of the October meeting were read and approved, followed by reading of the October minutes of the Southern Division. Mr. Perry R. F. Marshall, Dr. R. L. Ridgon, Mr. J. W. McKibben, and Mr. John W. Stacey were elected members of the Club. Elections by the Southern Division in October were approved.

New names proposed were: Mrs. Charles Gilman Hyde, 2579 Buena Vista Way, Berkeley, by Mrs. Edwin B. Mead; Mr. George B. Culver, Stanford University, by Prof. J. O. Snyder; Mr. and Mrs. Lewis Arnold, 2732 Benvenue Ave., Berkeley, by Mrs. Edwin Blake; and Mrs. Lydia Wilcox, 10 Latona St., San Francisco, by Mrs. Eva D. Roe. Mr. Storer reported for the committee appointed to investigate the eagle situation in Alaska.

Business completed, the program as announced for the evening was presented. Mrs. Allen gave a summary of bird bands placed during 1918, 1919, and 1920, the main item being the return of three winter visitants to the same feeding table where they spent the previous winter. Dr. Grinnell explained the meaning of adventitious coloration and described the case of a pair of Plain Titmouses in plumage colored yellow, probably by the spores of a fungus which lined the cavity occupied by them. Mr. Law took up in detail the probable origin of the three groups of subspecies of the Fox Sparrow as described by Mr. Swarth in his recent monograph. In his reviews of recent literature, Mr. Swarth gave critical estimates of articles by L. R. Dice, R. C. McGregor, Bangs and Kennard, and F. M. Chapman. A number of interesting seasonal observations were presented, after which the meeting was adjourned.—AMELIA S. ALLEN, *Secretary.*





For Sale, Exchange and Want Column.—Any Cooper Club member is entitled to one advertising notice in each issue free. Notices of over ten lines will be charged for at the rate of ten cents per line. For this department, address W. LEE CHAMBERS, *Eagle Rock, Los Angeles County, California.*

FOR SALE—Complete sets and odd vols. Nidologist, Osprey, Condor, and N. A. Fauna; Auk, VII-XXVII inclusive; Ridgway's "Manual", "Birds Mid. & North Am.", "The Hummingbirds"; Coues, "Ornithological Bibliography", complete and parts, "Key", "Birds of Northwest"; Turner, "Contributions Nat. Hist. of Alaska"; Nelson, "Natural History Collections in Alaska"; Stejneger, "Exploration Commander Ids. & Kamchatka" (ornithological, col. plates), "Poisonous Snakes of N. A."; Allen, "Hist. Am. Bison"; Hornaday, "Extermination of Am. Bison"; Stearns, "New Eng. Bird Life", 2 vols.; "Cory", Birds of Bahamas"; Biological Survey Bulletins; National Museum Reports, Proceedings and Bulletins; Cope, "Crocodylians, Lizards & Snakes of N. Am.", "Cretaceous Vertebrates"; Elliott, "Seal Islands"; Dwight, "Our Feathered Game"; Minot, "Land & Game Birds of New England"; Macoun, "Cat. Canadian Birds"; Marsh, "Dinocerata"; Samuels, "Birds of New England"; and many others, rare and out of print.—Dr. T. W. RICHARDS, Box 292, Annapolis, Md.

HAROLD H. BAILEY of Newport News, Virginia wishes to announce that he has moved his Museum and Library of Natural History to Miami Beach, Florida, where he expects to establish at an early date "The Florida Museum of Natural History". Mr. Bailey has also started work on a book on the Birds of Florida, and any notes on Florida birds will be appreciated by him. Address all correspondence and specimens in the future to HAROLD H. BAILEY, Route One, Miami Beach, Miami, Fla.

WANTED for cash: Bendire's "Life Histories", vol. II.—ROSWELL S. WHEELER, 166 Athol Ave., Oakland, Calif.

WANTED—Names of collectors who put up first class skins, who have American or foreign birds to trade for Illinois and Japanese birds.—H. K. COALE, Highland Park, Illinois.

WANTED, to buy—Old copies of THE CONDOR, as follows: v (1903), nos. 1-2-3; vi (1904), nos. 1-4; vii (1905), nos. 3-5-6; viii (1906), nos. 2-6; ix (1907), no. 1; x (1908), nos. 1-4; xi (1909), nos. 1-2-3-5; xii (1910), no. 6; xiii (1911), nos. 1-2-3. On Sale: Out-

of-print volumes or part-volumes of Nidologist, Bird Lore, Osprey, Ornithologist & Oologist; The Auk; Wilson Bulletin, and others. Rare bird pamphlets; N. A. Faunas, and other similar pamphlets. Ten old-time issues of THE CONDOR (duplicate), for exchange.—P. B. PEABODY, Blue Rapids, Kansas.

Two young men, now in college, are anxious to obtain positions on a collecting crew during the next summer vacation. Dates: June 5 to September 5. Anyone interested please write GORDON ALEXANDER, Box 191, Fayette, Mo.

WANTED—Will pay cash or exchange for Bird-Lore, vol. I, 3; index; vol. II, 1; vol. III, 1-2-3; vol. IV, 1-2; vol. VII, 1; vol. X, 4-5-6; vol. XIII, 4. Ornithologist & Oologist. vols. VI and VII complete; vol. XI, 2-3-4-5-6; vol. XII, 10. Maynard's Birds of Eastern North America; McIlwraith's Birds of Ontario, 2nd edition.—H. H. JOHNSON, Pittsfield, Maine.

THE COOPER CLUB has just fallen heir to the following publications which may be of interest to its members. We are quoting them at prices that just about cover trouble and expense of mailing.

The Story of the Farallones, Barlow,
1897 20c

Birds of the Santa Barbara Islands,
Grinnell, 1897 50c

Birds of Los Angeles County, Grinnell, 1898 20c

Address W. LEE CHAMBERS, Business Manager, *Eagle Rock, Los Angeles, Calif.*

I want odd volumes of Proceedings of the Biological Society of Washington—W. LEE CHAMBERS, *Eagle Rock, Los Angeles, Calif.*

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WANTED—Following numbers of The Auk to complete my set; vol. III, no. 4; vol. VI, no. 1; XXVIII, no. 3.—TRACY I. STORER, *Museum of Vertebrate Zoology, Berkeley, Calif.*

MEETINGS OF THE COOPER ORNITHOLOGICAL CLUB

Northern Division: 8 P. M., *fourth Thursday* of month, at Museum of Vertebrate Zoology, University of California, Berkeley. Take any train or car to University Campus. The Museum is the corrugated iron building on south side of campus just north of football bleachers.—MRS. AMELIA S. ALLEN, Sec'y, 37 Mosswood Road, Berkeley, Calif.

Southern Division: 8 P. M., *last Thursday* of month, at Museum of History, Science, and Art, Exposition Park, Los Angeles. Take car marked "University", west-bound on 5th Street (in down-town district); get off at 39th Street and Vermont Avenue. One long block east to Park. The Museum is the building with the large dome.—L. E. WYMAN, Sec'y, care of Museum.

Intermountain Chapter: Get date and place from the Sec'y, ASHBY D. BOYLE, 351 5th Ave., Salt Lake City, Utah.

San Bernardino Chapter: Get date and place from the Sec'y, M. FRENCH GILMAN, Banning, Calif.

OPEN LETTER TO CONDOR CONTRIBUTORS

The building of a journal begins with the mechanical preparation of the copy by the author. This work may be so managed that it will later contribute toward accuracy of workmanship, dispatch in handling, and economy of production. Coöperation of author with editor, publisher and printer results in benefit to all four. The author secures creditable presentation of his ideas, the editor is relieved of needless drudgery, the publisher obtains the highest quality and best service for the amount expended, and the printer profits by the economy of time, effort and materials.

As regards the author, an important feature of his coöperation is to see that his *manuscript is as nearly as possible ready for delivery to the printer*.

The Condor is published by the Cooper Ornithological Club, and practically all the Club's money goes into the magazine. Articles published in *The Condor* are written by Club members. Poor copy for the printer results in poor proof, requiring repeated resetting of type and rereading of proof. *Resetting type costs money*. Money saved by good management in this regard may be expended toward a larger and better magazine. As an aid toward such economy the following rules and recommendations have been drawn up.

RULES

1. Manuscripts, if not typewritten, should be in *perfectly clear handwriting*.
2. Use one side of the paper only. *No circumstances allow of an exception to this rule*.
3. In typewritten manuscript *always leave double space between the lines*. In handwritten copy leave as much space as is occupied by the written line itself.
4. Liberal margins should be left at the top and sides of the sheets; at least $1\frac{1}{4}$ inches at the left side.
5. *The author should himself prepare copy for titles, and, where needed, for sub-titles*.
6. *The author should himself prepare full and illuminating captions for illustrations*.

RECOMMENDATIONS

It may be assumed that the author has used due care and thought in the arrangement of his material, in logical sequence of presentation, and in conciseness and clearness of statement. But before the manuscript is submitted it will be well to give it thorough revision as a whole. The excision of superfluous words and phrases, and of immaterial detail generally, will not only make for clearness and precision, but will also reduce the cost of publication appreciably. *Conciseness is particularly to be recommended in papers on technical subjects*.

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There are "manuals" published that give detailed instruction for the preparation of manuscript. Those who care to provide themselves with such aids will find them useful. Two such standard publications are the *Manual of Style*, issued by the University of Chicago Press, and *Suggestions on the Preparation of Manuscript*, by the University of California Press.

Respectfully submitted,

THE EDITORS OF THE CONDOR.

